Metasys System Configuration Guide

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Johnson Controls

Metasys System Configuration Guide Introduction

This document introduces the components and capabilities of the Metasys® system. It also describes how the system operates and provides an overview of the various configurations. It is an expansion and replacement for the *Metasys System Extended Architecture Overview Technical Bulletin (LIT-1201527)*.

For a list of Metasys system related documentation, please see *Table 17* at the end of this document.

Metasys System

The Metasys system is a web-based system that allows day-to-day building operators to access the system's UI. The Metasys system user experience is a portal into a site. It can be tailored to fit the needs of all potential system users. The user experience provided by the Metasys system can evolve and scale to match the needs of any single facility or campus of multiple buildings. Two variations of the UI are available: Site Management Portal and Ready Access Portal.

The **Site Management Portal** provides real-time and historical data views, extensive alarm management capabilities, and system configuration functions for system administrators or dedicated building operators. The Site Management Portal transforms the raw data from the site and organizes it into a comprehensive set of information management tools and reports. This portal is accessed using the Launcher through an Internet or intranet connection to a Metasys server or engine. The Site Management Portal has all the features one expects from a full-function traditional workstation, including:

- pop-up alarm windows
- navigation tree - you can create multiple custom trees to best represent the logical layout of the facility
- dynamic graphics of systems and floor plans that you can zoom in on to show fine details
- multiple display areas you can size and control individually
- global search function and sorting capability that helps you find system information within seconds
- the entire user manual available in the Help system

The **Ready Access Portal** software provides a natural, complementary extension of the Metasys Site Management Portal UI. The Ready Access Portal UI provides an intuitive, task-based interface that can be tailored to meet the needs of building tenants and other specialized users. When using a computer or handheld device, you need only a web browser to connect to the computer running the Ready Access Portal software.

Information Management is an inherent capability of the overall user experience and reporting capabilities. Whether you are logged on to the Site Management Portal UI running online reports, using the Metasys Advanced Reporting System, or retrieving data from an engine with the Export Utility, you are transforming the data collected by the system into information you can use to manage your site.

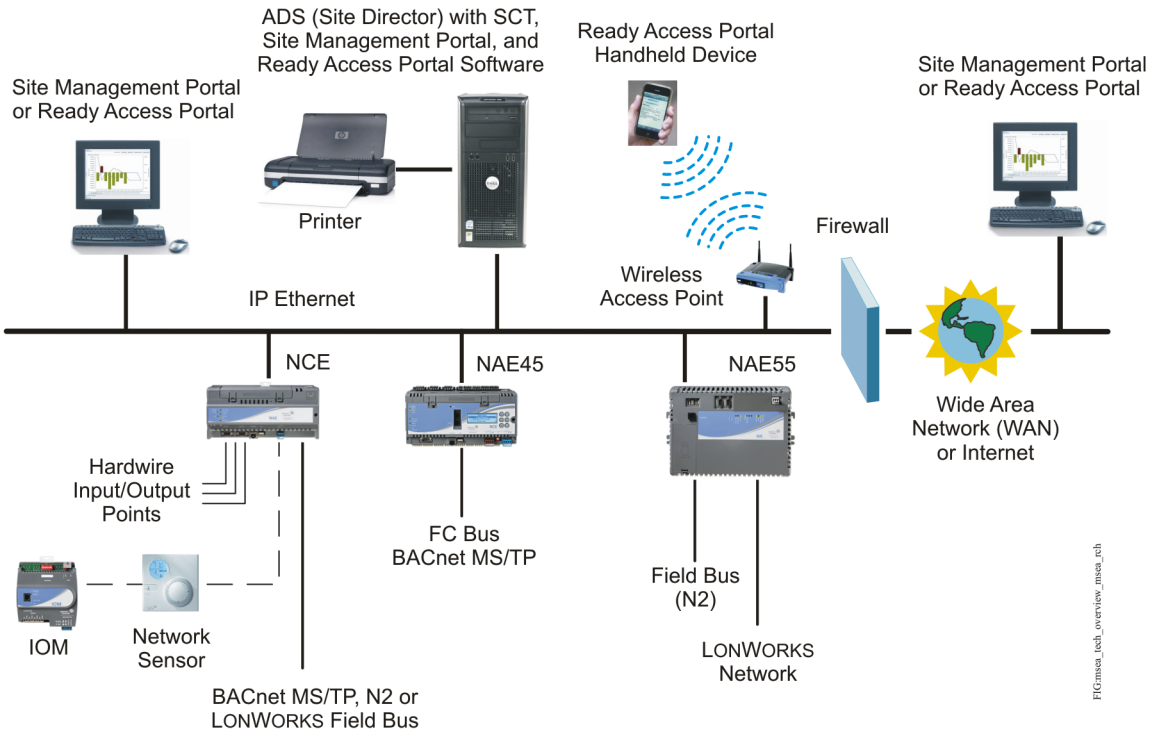
A Metasys site comprises one or more Metasys devices on a continuously connected IP network. A site's primary network consists of one or more engines. The engines also provide the Site Management Portal UI that allows for the configuration of the primary network and user monitoring of all devices on the network. Engines can be Network Automation Engines (NAEs), Network Integration Engines (NIEs), Network Control Engines (NCEs), or LONWORKS® Control Servers (LCSs). These engines are described in further detail in this document.

A site can optionally have one or more Metasys servers—computer-based devices that add long-term data storage and support for larger Metasys networks. Metasys servers can be either Application and Data Servers (ADSs), ADS-Lites, or Extended Application and Data Servers (ADXs), which are described in further detail in this document. Servers provide the same Site Management Portal UI as the engines. Additionally, you can install Ready Access Portal software on an ADS/ADX.

Each Metasys site has one device (engine or server) that is designated at the Site Director. Typically, the Site Director is the single point of access for all Site Management Portal UI users because the Site Director includes a view of all Metasys devices on the site. If a server is connected to a site, it must be designated as the Site Director. For more information, see *Site Director*.

Figure 1 shows an example Metasys system configuration. The *Metasys System Configuration Examples* section shows a variety of configuration examples.

Figure 1: Example Metasys System Configuration



Metasys System Components

ADS and ADS-Lite

The ADS is a Metasys server running on a computer that has a supported Microsoft® Windows® operating system and two specific components. The first component is the relational database management system using a supported edition of Microsoft SQL Server™ Express software to store collected trend data, audit trail messages, and alarm and event messages with operator annotations. The second component is the Web server software that provides Site Management Portal UI (and optionally Ready Access Portal UI) access to data and routes commands to the Metasys system.

The ADS also:

- supports a greater of number engines as a Site Director than an engine supports
- supports multiple, simultaneous international languages at the user interfaces
- allows a greater number of simultaneous users than is supported by an engine
- provides added storage for memory-intensive Metasys features, such as User Graphics

The **ADS-Lite** is a specialized offering that enforces specific localized market connection limitations to other Metasys devices like ADSs and engines. See *ADS System Requirements* for details.

ADX

The ADX is a version of the ADS with extended capabilities for historical data archiving that expand the multi-user Web access capabilities of the system. The ADX supports the relational database management system that uses a supported edition of Microsoft SQL Server software to store collected trend data, audit trail messages, and alarm and event messages with user annotations. This relational database also stores configuration information for site security, trend studies, and other features. The ADX supports the Metasys Advanced Reporting System, which has a Web-based reporting interface and standard report sets that allow users to review the alarm and trend configuration of their site, run summary and detail reports to monitor alarm and event information, view offline information, combine alarm and audit information in a single report, and aggregate trend data at a summary or detailed level. An ADX can also support the optional Energy Essentials reporting feature, which is an extension of the Metasys Advanced Reporting System.

If the ADX Software with its accompanying SQL Server database software is installed on one computer, it is known as a Unified ADX. If the SQL Server software is located on a different computer, it is set up as a Split ADX.

If your site has less than 50 NxEs, the ADX can be installed in a split configuration with the ADX software/Site Management Portal UI on one computer (the Web/Application server computer) and the historical trend, audit, and event data on another computer (the Database server) running Microsoft SQL Server software. The SCT, which is used to generate, back up, and restore the network database offline, is installed on a separate computer in split configuration. The Metasys Advanced Reporting System is also available in a split configuration if the SQL Server database components are installed on the Database server and the SQL Server Reporting Services are installed on the Web/Application server. In a split configuration, you can place your database server behind a firewall for an added layer of data protection.

Launcher

The Launcher is a software application that lets you access any Metasys system server or supervisory engine on the building network, regardless of its software version. Key features of the Launcher include:

- Installation of a separate folder to store the Metasys release software on your hard drive. This practice provides for an isolated, private version of the Java® Runtime Engine required to run Metasys software. If you have installed multiple releases of Metasys software, a separate folder is created for each. Starting with Release 6.0 this allows independence from the public Java Runtime Engine.
- Support to launch any version of the Site Management Portal (SMP) user interface or SCT. Supported user interfaces include the ADS, ADX, Network Automation Engine (NAE), and Network Control Engine (NCE).
  Note: For Release 5.2 or earlier, the specific Java Runtime Environment (JRE) particular to the SMP or SCT software release is still required on the client computer.
- Support for launching any website, including Metasys software products such as Ready Access Portal and the Metasys Advanced Reporting System, as well as popular websites such as Google® and Yahoo!®.

Contact your local Johnson Controls® representative for access to the Launcher software.

LCS

The LCS85 is a computer-based server that is used to communicate with LonWorks devices over an IP network. The LonWorks field devices are normally connected to an IP router. This arrangement allows the Metasys system to be used in a flat LonWorks configuration.

Metasys Database Manager

The Metasys Database Manager provides both database management and database monitoring functions, handled in two separate windows. Database management includes summarized information on and methods for backing up, purging, and restoring Metasys system ADS/ADX trend, alarm (event), and audit databases. Monitoring includes an indication of database status compared to three levels of defined database sizes.

NAE

The NAE is a Web-enabled, Ethernet-based supervisory controller that monitors and supervises networks of field-level building automation devices that typically control HVAC equipment, lighting, security, fire, and building access. The NAE provides features including alarm and event management, trending, archiving, energy management, scheduling, and password protection through its embedded Site Management Portal UI. Different models and options support various communications protocols including BACnet over IP, BACnet® Master-Slave/Token-Passing (MS/TP), N2 Bus, N2 over Ethernet, and LonWorks® protocol. The following models are available:

- The NAE55 Series supports a comprehensive set of supervisory features and functions for large facilities and technically advanced buildings and complexes.
- The NAE35 and NAE45 Series extend the power of the NAE to the smaller buildings (or small areas of larger buildings) and enable the wider distribution of supervisory functions in larger facilities.
- The NAE45-Lite, available only in specific markets, is a functionally limited NAE45 that cannot be used as a Site Director and functions only with a corresponding ADS-Lite.
- The NAE85 supports large BACnet/IP integrations.

NCE

The NCE combines the network supervisor capabilities and IP network connectivity of an NAE with the Input/Output (I/O) point connectivity and direct digital control capabilities of a Metasys Field Equipment Controller (FEC). The NCE provides a cost-effective solution designed for central plants and large built-up air handler applications. All NCE models provide IP Ethernet network connectivity, the Site Management Portal UI, and the network supervisory functions featured on network automation engines, including the BACnet/IP integration. Depending on the model, an NCE supports either a BACnet MS/TP trunk, an N2 Bus trunk, or a LonWorks network trunk.

NIE

The NIE is a Web-enabled supervisory controller for integration of Metasys N1 networks. The NIE is a specialized version of the NAE and is designed to provide for the migration of existing N1 networks into the current generation Metasys system. The NIE provides the same Site Management Portal UI as the NAE. Unlike the NAE, the NIE does not support integration of BACnet MS/TP or BACnet IP, N2, or LonWorks networks. Two models of the NIE are available. The NIE55 supports smaller N1 networks, while the NIE85 supports large N1 integrations.

SCT

The System Configuration Tool (SCT) assists in all phases of engineering, installing, and commissioning engines and servers in a Metasys system. The SCT can be used offline to create archive databases that can be downloaded to an engine or server. The SCT also allows you to upload and archive databases that were created or modified online from an engine or server. Using the SCT, you can view and configure multiple sites in one archive. The SCT has the same look and feel as the Site Management Portal UI. Two diagnostic reports are available that provide helpful system statistics and list any unbound references found in the database.

The SCT also provides a Simulation feature, which allows you to simulate a functioning engine and test database control logic prior to downloading it. Simulation allows you to perform commissioning and configuring tasks on simulated devices when the Metasys system is offline. In Simulation mode, you can test commands and see how a real system reacts if commanded to perform the same action. The same features are used to commission both simulated and online devices.

The SCT supports commissioning of N2 devices by allowing HVAC PRO software, GX-Tool software, and XTM Configurator software to access the devices on the N2 Bus of an engine. The SCT also supports commissioning of FECs by using Controller Configuration Tool (CCT) software to access the devices on the Field Bus of an engine.

Wireless Solutions

Several wireless Metasys solutions are available for integrating wireless connectivity in desired portions of a Metasys network. These solutions provide wireless communication between controllers, thermostat controllers, coordinators, routers, and room sensors.

- ZFR1800 Series Wireless Field Bus System
- TEC Wireless Thermostat Controller System
- WRS Series Many-to-One Wireless Room Temperature Sensing System
- WRZ-7850 One-to-One Wireless Room Temperature Sensing System
- TE-7800 Series One-to-One Wireless Room Temperature Sensing System

These wireless solutions reduce costs by minimizing wiring, provide application mobility and flexibility, and simplify the challenges of difficult or cost-prohibitive installations or renovations. The wireless solutions can coexist with each other, and offer the flexibility of coexisting with hard-wired Metasys solutions.

CCT

The Controller Configuration Tool (CCT) is used in conjunction with the Metasys system user interface to configure, simulate, and commission FECs, Advanced Application Field Equipment Controllers (FACs), Input/Output Modules (IOMs), NCEs, VMA16s, and DIS1710 Local Controller Displays on a BACnet® MS/TP Bus. You must install CCT on the same computer as SCT software to use the Ethernet Passthru option in SCT.

The CCT includes the ZFR Checkout Tool (ZCT). The ZCT allows you to validate the wireless connectivity and health of wireless devices within a ZFR1800 Series Wireless Field Bus System to help ensure a reliable wireless mesh network is in place.

The CCT is a separate software installation included on the SCT product disk.

Metasys System Capabilities

Site Director

When a user accesses any engine or server directly through a Web browser, only the information local to that device is accessible. To make all information in the facility accessible from a single point, the Metasys system uses a Site Director. The Site Director is the device designated to maintain the site information, including the logical organization of data about your facility (called User Views), user password administrative information, and overall master time and date. This function resides in an engine or, on large installations, a server. For networks that do not have a server, one of the engines is designated as the Site Director. When one or more servers are part of the network, one server must be designated as the Site Director. The Site Director provides a uniform point of entry and supports functions such as user logon, user administration, time synchronization, and traffic management.

Consider a server as the Site Director if you require:

- support of multiple international languages
- repository for trend and alarm data and operator transactions, along with annotations for MVE systems
- a greater number of simultaneous users than an engine allows
- additional storage space for graphics

Time Management

The time and date used by all devices connected to a site are synchronized automatically, preventing errors from manual time entry and clocks that become inaccurate over time. Network-wide time management ensures that scheduling, trending, audit trailing, data collecting, time-stamping of alarms, and other functions requiring accurate time management use the same time and date consistently for all system operations. Because the Site Director is the master time keeper for all engines and servers on a single site, all of these devices are assumed to use the same time zone for all time-rated functions.

For network-wide time synchronization, the engine or server acting as Site Director is the time server for the entire site. All other devices are time clients because they receive the time from the Site Director. The Site Director can be configured to use three different methods of time synchronization: Unicast Simple Network Time Protocol (SNTP) (also known as Microsoft® Windows® time synch), Multicast SNTP, or BACnet time synch. The Site Director can also be configured to synch its time from an external website.

System Navigation

Users can create customized system navigation schemes in the form of User Views, a hierarchical method of organizing and displaying some or all of the items within a system. A Metasys system administrator can limit a user's access to the Metasys system by creating User Views and assigning them to specific users. User views provide organizational structure and data filtering for the information displayed in the Metasys Advanced Reporting System UI and the Ready Access Portal UI.

Monitoring and Commanding

Monitoring and commanding allows you to efficiently navigate through items associated with your building operations as well as view, analyze, and modify these items. After creating items with wizards, use these features to:

- access, view, and modify item data
- send commands to items
- run reports to analyze item information

Preferences

The Metasys system provides customized preferences for the Site Management Portal. The preferences allow you to configure how the UI behaves, including the sounds and colors, the startup views, alarm priorities, and links from within the UI to external applications. Preferences are divided into two categories: system preferences and user preferences. System preferences apply to all users who log on to the site or device and affect the performance and operation of the system. User preferences apply to a specific Metasys system user and define how information is displayed in the UI. User preferences do not affect the operation of the system.

Alarm and Event Management

The alarm and event feature provides event management for the system and allows you to configure the routing of event messages to destinations such as the server for permanent storage. The Metasys Site Management Portal UI features a pop-up alarms window, which alerts the operator to potential problems whenever the operator is logged on to the system; and an event viewer, which provides for greater analysis or a history of alarms and events in the system. The Ready Access Portal UI features an Alert Summary view, which allows the user to view and acknowledge recent event history.

The Metasys system allows alarms and events to be configured using either a Metasys alarm extension or a BACnet alarm (intrinsic or algorithmic). Metasys alarm extensions generally provide more feature capability and ease of setup, whereas the BACnet alarms provide better interoperability with other BACnet systems.

Note: An event is a notification of a status change in the Metasys system. An alarm occurs when a value defined in an engine goes outside of a user-defined range, changes to a user-defined contact condition, or fails to respond to a command within a user-specified time. When an alarm occurs, an event is generated. Events can be generated by any Metasys platform. For example, if the NAE detects that a network node is offline, it can generate an event. If an error occurs in the server platform, an event can also be generated. Once an event is generated, it is stored in an Event Repository file located on the device that generated the event. You can retrieve and examine events stored in the Event Repository.

Destination Delivery Agents (DDA)

DDAs are the method used for routing and delivering Metasys alarm extension event messages to destinations such as pagers, printers, email, and Network Management systems. The Metasys system uses an email DDA, Pager DDA, Printer DDA, and Simple Network Management Protocol (SNMP) DDA. The email DDA supports standard Simple Mail Transfer Protocol (SMTP), Post Office Protocol (POP), and Internet Message Access Protocol (IMAP).

SNMP provides IP standard SNMP functionality in the Metasys system, enabling network administrators to manage Metasys network performance, find and resolve Metasys system-related issues, and plan for future growth of the Metasys system. SNMP functionality uses standard SNMP Versions 1, 2C, and 3 (excluding SNMP encryption and authentication support). Metasys system allows delivery of unsecured SNMP traps for Metasys alarm events from all engines and servers to the facility owner's Network Management System (NMS), and allows the NMS to execute SNMP Gets against engines. This version of SNMP support does not include the SNMP set commands.

Johnson Controls has developed a downloadable custom dynamic Management Information Base (MIB) that allows the NMS to monitor Metasys point objects, display attributes, and control sequence objects. The MIB is constructed to accurately reflect the additions and deletions of objects in the supervisory devices as the changes occur. The custom MIB defines explicit traps and associated attributes that align with Metasys alarm messages, making data correlation (parsing/sorting) at the NMS straightforward and seamless.

Alarm Printer

Alarms from supervisory devices can be sent automatically to an alarm printer if one is configured and online.

Scheduling

Scheduling provides a graphical user interface that illustrates when events are scheduled to occur. Scheduling automates routine functions, such as transferring a room from occupied mode to unoccupied mode for heating and cooling needs, and energy optimization. Each schedule consists of a weekly schedule, an exception schedule, a list of items in the schedule, and an effective period. Exception schedules take precedence over the daily schedule only for their configured length and then return the schedule to its typical weekly schedule. Exceptions can include references to Calendars that can, for example, reflect a holiday schedule for the entire facility or show selected tenant spaces in the building. Another view within the schedule, called Today's Schedule, shows the current day's schedule including how each exception schedule affects the current day's schedule.

Historical Data Management (Trend)

The Metasys Historical Data Management capability allows you to collect, store, and view historical samples of object data. With the information generated by this feature, you can manage energy usage, prove compliance to standards, and diagnose problems in your facility.

Each engine has a local buffer where it stores trend samples. The size of this buffer, in number of samples, is configurable by the user. If a server exists on the site, you can send the trend samples to its database. This database supports backup, restore, and archival of data to long-term storage. You can display trend data as a graph or table of values on the Site Management Portal UI or more recent historical data can be displayed as a graph or table on the Ready Access Portal UI. Trend data can also be copied to the browser computer's clipboard, allowing the data to be transferred to spreadsheets, databases, and Microsoft Word documents.

Using the Site Management Portal UI, multiple point trends can be shown on a single graph or table, making it easier to detect system-level performance. These multiple trends can either be predefined in a Trend Study, or the user can dynamically select various point trends to display on a single graph using the Trend Viewer. The Site Management Portal UI also offers information on the rate of events, rate of samples, and number of samples that are lost. Refer to the Metasys system *Help (LIT-1201793)*.

Export Utility Software

The Export Utility software provides facility managers with the ability to easily build custom reports using historical data from the Metasys system. This data can be used to manage daily building operations. Export Utility software extracts historical trends, alarms, and audit data from an engine or server. This data can be collected from the system and stored in up to six different formats desired by the operator for analysis, including Microsoft Word or Microsoft Excel. A scheduling feature is also provided to retrieve and save data based upon user-configurable time intervals.

The Export Utility provides the user with the ability to create runtime studies and discover root cause analysis of system changes and mechanical equipment failures. You can also use it to collect trended runtime data for use by a Computerized Maintenance Management System (CMMS) to schedule mechanical maintenance of HVAC systems.

Metasys Advanced Reporting System

The Metasys Advanced Reporting System is a standard capability for all ADXs when using SQL Server 2008 R2 software, or SQL Server 2008 software, with SQL Server Reporting Services (SSRS) installed. The Web-based reporting interface provides standard report sets to allow users to review the alarm and trend configuration of their site, run summary and detail reports to monitor alarm and event information, view offline information, combine alarm and audit information in a single report, and provide summary and detailed trend aggregations. The report information is filtered by the site's All Items or User View navigation tree. Users can customize the date range and data type desired for each report. Once a report is created in the user interface, the option to export the data into common applications, such as Microsoft Excel spreadsheet or Adobe® PDF formats, is available.

Energy Essentials

Energy Essentials is an optional software feature that can be added to the Metasys Advanced Reporting System. It offers seven types of energy reports that provide a high-level view of normalized energy use across your site, and presents your daily electrical demand graphically.

Graphics+ Feature

The Graphics+ feature lets you monitor and control the Building Automation System (BAS) through a graphical display. This feature is made up of two main components: the Graphic Generation Tool (GGT) and the Graphics+ Viewer.

The Graphic Generation Tool lets you create and modify Graphics+ objects using your computer. This stand-alone application runs on any supported Windows OS computer to deliver an ideal platform for creating sophisticated graphics for your entire facility. You can save these graphics directly to a supported Metasys Host, such as a Site Director or a System Configuration Tool (SCT) archive database. The tool includes a Metasys Graphics Package with an extensive library of pre-built dynamic elements and templates that help you create system and floor plan graphics. The GGT also lets you bind the dynamic elements directly to Metasys objects quickly and easily. Graphics built with the tool are saved to the Site Director or engine as Graphics+ objects and viewed from and interacted with the Site Management Portal UI or Ready Access Portal UI.

The Graphics+ Viewer (displayed within the Site Management Portal UI, SCT UI, and the Ready Access Portal UI) shows Graphics+ objects using real-time controller field point data and lets you command and update points. These graphical displays give you 3-D views into the inner workings of your facility, offering an intuitive and alternative way to manage the daily events of your building or campus.

User Graphics

User interaction with the Metasys system can be done using a graphic presentation on the Site Management Portal UI or the Ready Access Portal UI. The User Graphics Tool (UGT) is used to view, create, and edit user graphics. This application provides a way to monitor and control a facility through a graphic representation presented in a functional format.

Advanced Graphics Application Software

The Advanced Graphics Application is an enhanced graphics creation package that provides additional dynamic capabilities, such as custom animation, color changing, and flashing for the Metasys system, which are not supported by Standard Graphics. The package includes a dynamic example stencil library and is an add-on to Microsoft Visio® software. With a more comprehensive representation of facility support systems, building operators can easily monitor the health of the system on a more intuitive interface. Advanced graphics are viewed from the Metasys system Site Management Portal UI.

System Security

User access to the Metasys system is controlled by user accounts. An account defines which portions of the Metasys data a user can access (for example, all HVAC data or all lighting data from a particular area of the building) and which functions the user can perform on that data, from view-only access to configuring new databases. The Metasys system provides the ability to divide the data into 25 unique categories, including HVAC, fire, and security; and has 10 different levels of user functionality.

User accounts can be further limited to operate only at specified times on specified days of the week. All account settings are created by a System Administrator.

Each account can also have associated preferences, such as which graphic or trend to display when a user logs on to the Site Management Portal UI, or which User Views appear in the Navigation Tree.

Basic Access offers limited operator access to Site Management Portal features based on the user's assigned permissions in the Security Administrator. Basic Access is offered on all the Metasys system engines and servers but is the primary mode of access for stand-alone NAE3514, NAE3515, NAE3524, and NAE3525 models.

Microsoft Active Directory® accounts can be used with the Site Management Portal and Ready Access Portal. In addition to making it easier for system administrators to manage Metasys account access, this feature also provides the ability to use Single Sign-On to access the Metasys system together with other supported applications on the enterprise network.

All user activities are recorded in the Audit Log, which allows the System Administrator to monitor user actions.

MS/TP Communications Bus

The MS/TP Bus is a local network that connects some NAE/NCEs and field controllers using BACnet MS/TP protocol. Two tiers of MS/TP Buses exist in the Metasys system architecture. The Field Controller Bus (FC Bus) consists of BACnet controllers and point interfaces supervised by an NAE/NCE. The Sensor Actuator (SA) Bus consists of point interfaces and networked sensors supervised by a field controller.

N2 Field Bus

The N2 Field Bus is a local network that links controllers and point interfaces to some NAE/NCE. The N2 Bus uses a master/slave protocol, in which the master device (the NAE/NCE) initiates the communication with the N2 Bus devices.

N1 Integration

The N1 integration is based on the NIE. A single NIE or a network of multiple NIE devices are configured to map point objects of all or selected Network Control Module (NCM) devices on one or multiple existing Ethernet N1 networks. The NIE to which an N1 object is mapped provides alarm and event management, trending, energy management, and scheduling capabilities.

P2000 Security Management System Integration

The Metasys system provides integration with the P2000 Security Management System. The P2000 integration offers the following features:

- View and interact with all aspects of HVAC facility operation. For example, floor plan graphics can contain dynamic information about environmental conditions and security status in a common display.
- View P2000 objects in the navigation tree; leveraging the use of a common user browser user interface
- Control output points and doors
- View P2000 events in the Metasys system Event Viewer
- Initiate actions on the Metasys system from P2000 Events

You can define functional interlocks between the P2000 and other systems managed by the Metasys system. For example, employee identification cards can be set to turn on the air conditioning system serving their work areas when they arrive in the building. For information, refer to the *P2000/P2000LE: Metasys System Extended Architecture Integration Option Manual (Part No. 09-9300-01)*.

Logic Connector Tool (LCT)

The Logic Connector Tool (LCT) is used to create custom application programs that execute in any engine. The programs are created using a drag-and-drop editor that allows the programmer to connect real-time point data in the engine with logic blocks that perform mathematical, logical, and various specialized control functions. LCT programs can be created, edited, and viewed online through the Metasys Site Management Portal UI, or offline using the SCT. When viewed through the SCT, the finished programs can be simulated to verify proper operation before being downloaded to the engine.

Interlock Object

The Interlock object provides a means to establish conditional control over one or more other objects. It consists of an If conditional statement, True command statements, and False command statements. Through these statements, the user specifies a set of conditional checks (using one or more points) for which a series of commands is used to control a collection of one or more other objects.

Optimal Start

Optimal Start automatically determines the correct time to start HVAC systems to ensure the facility is ready for occupants at the scheduled time. It adjusts to seasonal variations and minimizes the energy used.

The generic standard object screens handle the Optimal Start/Stop object configuration and focus views. The object defines views for configuration and focus, and the generic screens interpret the views to display the proper fields to the user. No custom screens or handlers are needed.

Demand Limiting and Load Rolling

The Demand Limiting (DL) feature reduces utility bills by limiting peak energy usage. DL electively turns off (sheds) equipment, such as fans and lights, or adjusts setpoints to limit energy use during peak times.

The Load Rolling (LR) feature helps save money by reducing overall energy consumption. LR acts continuously to maintain a specified energy reduction by shedding unnecessary loads. A facility can implement either one or both of these features.

Audit Trails (Transaction Data Management)

The Audit Trail feature records events generated either by user actions or system activity. Examples of user actions include logging on to the UI or issuing commands to a point. Examples of system activity include device restart initialization settings or internal security changes. An audit message consists of the information that describes a significant event on the Building Automation System (BAS). For each significant event, a new audit message is generated and appears in the Audit Viewer.

Once an event is sent to the Audit Trails subsystem, an audit message is generated and stored in an Audit Repository file located on the server or engine that detected the condition.

Audit messages may be forwarded from the Local Audit Repository to a user-specified ADS Audit Repository for permanent storage on a server (ADS/ADX), based on user-defined rules.

The Site Management Portal UI contains the Audit Viewer that allows the user to view audit messages. Once a user logs on to the Site Director, the user can view all audit messages from the server or any device that contains a Local Audit Repository. When a user directly logs on to a device not designated as the Site Director, the user can only view audit messages in that device's Local Audit Repository. Any audit messages generated on a server are placed directly into the ADS/ADX Audit Repository.

System Diagnostics and Serviceability

The engine provides collection and storage of diagnostic data. The Diagnostic view of the engine device retrieves and displays diagnostic data related to communications, internal component performance, and other areas.

Metasys for Validated Environments

Metasys for Validated Environments (MVE), extended architecture is a feature designed for facilities that require regulatory compliance for their environmental systems. The MVE feature operates on an ADX, NAE55, NCE25, and NIE55, which are all supported as validated devices.

MVE is specifically designed to help customers address United States Food and Drug Administration (USFDA) Title 21, Code of Federal Regulation (CFR) Part 11 compliance. MVE is also compliant with other similar agencies around the world that deal with electronic records and electronic signature requirements, such as Annex 11 of the European Union Good Manufacturing Practice (EU GMP) regulations (European Medicines Agency [EMEA] 1998).

The ADX with MVE software provides secure data management and reporting capabilities, traceable electronic records and signatures, and time-stamped audit trails for facilities subject to Part 11 compliance. It manages and protects the long-term storage of trend data, audit data, event/alarm messages, annotations, and system configuration data. In addition, complex passwords and message encryption secure the system from unauthorized access and data tampering.

UL 864 UUKL Ninth Edition Smoke Control Listing and Fire Panel Integration

Components of the Metasys system running Release 5.2 software are Underwriter Laboratories (UL) 864 UUKL Ninth Edition listed for smoke control. In applications requiring smoke control, this offering provides the protection of a UL 864 UUKL listed smoke control system that has a lower installed cost and leverages the operational efficiencies of using a single system to provide HVAC and Fire Alarm smoke control. Earlier versions of the Metasys system also support UL 864 UUKL Eighth Edition. Eighth Edition and Ninth Edition hardware must be isolated from each other via an Ethernet switch to coexist in a building.

The Metasys Smoke Control System consists of a set of hardware components specifically UL 864 Ninth Edition Listed for indoor, dry environments. The smoke control applications are running in an NAE/NCE and our MS/TP field controllers with a dash U suffix. The Smoke Control UL 864 listing at Release 5.2 now includes the listing for the US and Canada at Ninth Edition. The listing title is Metasys System UL 864 9th Edition UUKL/ORD-C100-13 UUKLC Smoke Control System.

The smoke control offering provides a configurable yet straightforward application for receiving fire alarm and smoke control inputs from various systems and allows for the automatic triggering of smoke control schemes. The system also enables a designated operator to execute real-time control from an annunciator panel, the Automation Displays, Incorporated (ADI) UL Listed Firefighter’s Smoke Control Station (FSCS), or its primary user interface, based on the specific dynamics of a fire/smoke control event in a building. The system ships with a set of pre-configured standard applications.

Metasys System Revision Compatibility Overview

This section describes high-level revision-to-revision compatibility scenarios for customer job sites and Johnson Controls employee laptops when upgrading to Metasys Release 6.0 and also contains some information on previous release revision compatibility for existing sites that are at a previous release. This section also describes revision-to-revision compatibility scenarios for the Graphics+ feature within Metasys user interfaces.

General Compatibility Information for Customer Job Sites

Starting at Release 6.0, SCT allows you to maintain both Release 5.2 and 6.0 engines in the site's archive. In order to maintain both 5.2 and 6.0 engines in the sites archive, the SQL Server version of your computer must match the SQL Server version used with the Site Director and the engines.

Starting at Release 6.0, new installations of ADS/ADX, Advanced Reporting System, Ready Access Portal, SCT, and CCT only support SQL Server 2008. MSDE, SQL Server 2000, and SQL Server 2005 are no longer supported.

The Site Director must be at an *equal or higher* revision to all the other servers and engines on a site. The Product Development Test Lab validates the latest revisions of a Site Director with a mix of Engines two revisions back. At Release 6.0 this included Release 5.1 and 5.2.

The SCT must be at the same revision as the Site Director when integrated with the ADS/ADX.

The SCT conversion process is tested from the current revision back two releases. At Release 6.0, the SCT conversion process was tested with Release 5.1 and 5.2. Release 5.3 was a controller only release rather than a Metasys system release so it is included as well.

For Sites where the Ready Access Portal and the Site Director servers are on the same server machine, the revision levels must be the same. Ready Access Portal installs can be at a later release level than the Site Director when Ready Access portal is installed on a separate server than the Site Director. Remember that at Release 4.0, the Ready Access Portal could only be installed on a separate server platform from the Site Director.

Starting at Release 4.1, MS-NxE55-0 Engines can no longer be upgraded beyond Release 4.0. Sites with **-0** NxE55s upgraded to Release 4.0 are tested to coexist with the latest revision Site Director.

It may not be possible to edit Graphics or Logic Connector tool (LCT) processes in an Engine at Revision 2.2 or earlier from a Site Director at Revision 3.0 or later. This is because the Scalable Vector Graphic (SVG) rendering program was changed after Release 2.2. As a workaround, log on to the Engine directly to make these edits.

Compatibility Rules for CCT and Field Controller Revisions

All revision-to-revision upgrade combinations for FEC/CCT applications are tested in the Product Development Test Labs. (Note that FECs and CCT were released at 2.1.)

In general, it is not necessary to have all FECs on the site at the same release level. The latest revision of CCT can open and commission any previous FEC application created with an earlier revision.

FEC revisions can be mixed and matched on any Engine with Master-Slave/Token-Passing (MS/TP) Integration. This means that Release 5.3 based FECs can be added to a Release 4.0 NxE's MS/TP Integration. The only risk is that some enumerations that were created in the 5.1 caf will not display properly in the engineering view for the FEC.

The CCT Upgrade Process works between major / minor revision levels (for example, Release 2.1 to 2.2, Release 2.1 to 5.0 etc). CCT applications created during Alpha / Beta site releases do not automatically upgrade (for example, 3.0.22 to 3.0.25).

The .caf files created by CCT are independent of the version of SQL Server (for example, a .caf file created on a customer's machine running SQL Express can be opened on a Branch laptop using MSDE).

The FEC Display was added at Release 3.0. To incorporate a display into an FEC installed at a release prior to 3.0, you must:

- upgrade the .caf file to the current release
- open the display configuration application within CCT and select the desired points to display
- download main and boot code, then download the upgraded .caf file

CCT only supports downloading main and boot code at the revision level of the tool (for example, CCT 3.1 cannot downgrade the main and boot code in an FEC back to Release 2.2).

For existing installations that require FEC upgrades to the latest release, we recommend that both main and boot code be downloaded from CCT or the AIM Point Schedule before the .caf files are loaded.

CCT / SCT pass-through support requires that SCT and CCT are loaded on the local machine.

New for SCT at Metasys Release 6.0

At Metasys Release 6.0, SCT allows you to maintain both 5.2 and 6.0 engines in the site's archive. The Site Director for the archive has to be upgraded to Release 6.0, but all engines for the site can be left at Release 5.2 and can still be modified offline in SCT and downloaded at Release 5.2. Within the site's archive, you can maintain a mix of 5.2 and 6.0 engines.

You can upload and convert previous Engine revisions with the SCT, but you cannot download to an earlier Engine. Therefore, once you upgrade a Release 5.2 engine to Release 6.0, the engine cannot revert back to Release 5.2. To download an application into an Engine at a prior release, you must upgrade the Engine via the NAE Update Tool to the same revision as the SCT before you can download the archive.

The archive upgrade tool functionality is integrated into the same wizard with the upload / download / synchronize wizard. The old load wizard selection has been renamed to **Manage Archive** to make it clear that there have been functionality improvements.

The Metasys System no longer relies on an Oracle® Java ® Runtime Environment (JRE) plug-in. Instead, it uses an internal **private** JRE that is not exposed to possible security risks, and is therefore compatible with IT department policies. A new Launcher application provides support for the private JRE. The Launcher application allows you to access any Metasys server or supervisory engine on the building network, regardless of its software version.

Note: Metasys releases prior to Release 6.0 still rely on the public JRE, which needs to be present on the client machines.

Working with SCT at Metasys Release 6.0

The restore and upgrade archive functionality in SCT saves time by simplifying the process of upgrading sites from Release 5.2 to Release 6.0 by allowing you to use one release of SCT. It also synchronizes the security databases. The functionality is most valuable for upgrading a large or multi-site customer, where the upgrade may be done over time.

Note: vTools continues to be the resource to use when working with Metasys systems at releases prior to Release 5.2. A benefit of upgrading to Metasys Release 6.0 is the ability to use one version of SCT to manage the site.

Note: The functionality of SCT at Metasys Release 6.0 described in this document applies only if the SQL version of your computer matches the SQL version used with the Site Director and the engines.

When you upgrade the Site Director at a job to Release 6.0, SCT allows you to maintain both Release 5.2 and 6.0 engines in the sites archive. The non-site director devices (like other engines) can be left at Release 5.2, modified offline in SCT and downloaded at Release 5.2. Within the site's archive, you can maintain a mix of Release 5.2 and 6.0 engines.

The Archive Upgrade Tool functionality has been integrated into the same wizard with the upload/download/synchronize wizard. The old load wizard selection has been renamed to **Manage Archive** to make it clear that there have been functionality improvements.

This selection provides the opportunity to use the SCT to open archives and upgrade selected devices. Specifically, you can:

- restore a backup of an archive database
- upgrade the archive database
- add a new supervisory device
- perform upgrades, including

- Single Device
- Supervisory Device (added earlier)
- Site Director

- Synchronize the Security Database

SCT now incorporates an Archive Upgrade Tool and a Security Backup/Restore function.

New at Graphics+ Release 1.2

- The Metasys system 5.2.10 patch must be applied to the Site Director server/device, SCT computer, and Ready Access Portal Server in order to fully utilize all features within the Graphics+ Release1.2 .
- Graphics+ Release 1.2 is guaranteed to be backward compatible with graphics created using the Graphics+ Release 1.1. Therefore, customers currently running Release 1.1 can upgrade to Release 1.2 without having to manually touch every existing customer graphic.

Revisions at Release 5.3

- Only CCT and the Field Controllers were revised at the release. Supervisory level engines, servers, and supporting tools were still shipped from the factory at Release 5.2.
- The 5.2.4 patch or greater for SCT is required for CCT pass through.
- The 5.2.4 patch or greater for engines and SCT is required for the integration of schedules and calendars from FACs to interface with engines.

Output Controller Module Upgrades

- Starting at Release 5.0, a new Adaptive Tuning Reset Network Input was added. This feature is created and connected only if you re-run System Selection. During the upgrade process, the interface to the PID is created but is not connected.
- Starting at Release 5.0, the Adaptive Tuning logic is disabled when the Output point associated with the Output Controller is overridden. This feature is created and connected only if you re-run System Selection.
- Starting a Release 5.1, the following feature updates were made to all Output Controllers.
- - General PID Process ID updates have been made to key tuning parameters and timer settings per control loop type. These changes are updated from either an upgrade or system selection.
  - **Fast Switching** logic that bypasses saturation timers when zones need to quickly transition from heating to cooling (for example, load changes in the space or setpoint changes). This logic is only created from system selection.
  - A new **Lead Compensator** block is automatically integrated into output controller modules for zone control loops on water valves. This block acts as like an anticipator and reduces the impact of the non-linearity of typical ball or globe valves. This is only created from system selection.
  - Updates to the default timer settings on Multi-Stage Controller (MSC) modules that reduce cycling of stages while maintaining setpoint in both the occupied or unoccupied modes. These timer settings are updated during system selection or manual updates of the unoccupied duration timer.
- Starting at 5.1, updates to Output Controller Modules that contain PID and PID preprocessor blocks are made even when the module has been user modified:
  - Output Controllers utilized with Proportional Outputs are fully upgraded with the latest logic and all the necessary internal connections.
  - Output Controllers utilized with Staged/MSC Outputs are upgraded with the latest primitives but the connections between the blocks are not made. Instead, the PID primitive uses the default tuning parameters.
- Starting at 5.1, four EWMA parameters are added automatically exposed during system selection to all the Output Controllers doing Zone Control (VAV Boxes, Fan Coils, Unit Vents and Heat Pumps).

FEC Wireless Integrations

The Wireless ZFR System was introduced at Metasys Release 4.0.

- Wireless coordinators need to be at an equal or higher revision level than the controllers associated with it.
- Within a wireless mesh, a mix of revisions of wireless pairs is allowed.
- Each wireless controller and associated wireless router need to be at the same release. CCT automatically syncs release revisions between a controller and its associated router.
- Release 4.0 controllers are not compatible with 4.1 or later wireless routers and need to be updated before connecting the wireless router.

P2000 and Metasys Compatibility

Metasys Release 6.0 has been tested for compatibly with P2000 Revision 3.10.

LCS8520 Compatibility

There are currently no issues with the integration of the LCS8520 to a Metasys Release 6.0 site.

Metasys System Configuration Examples

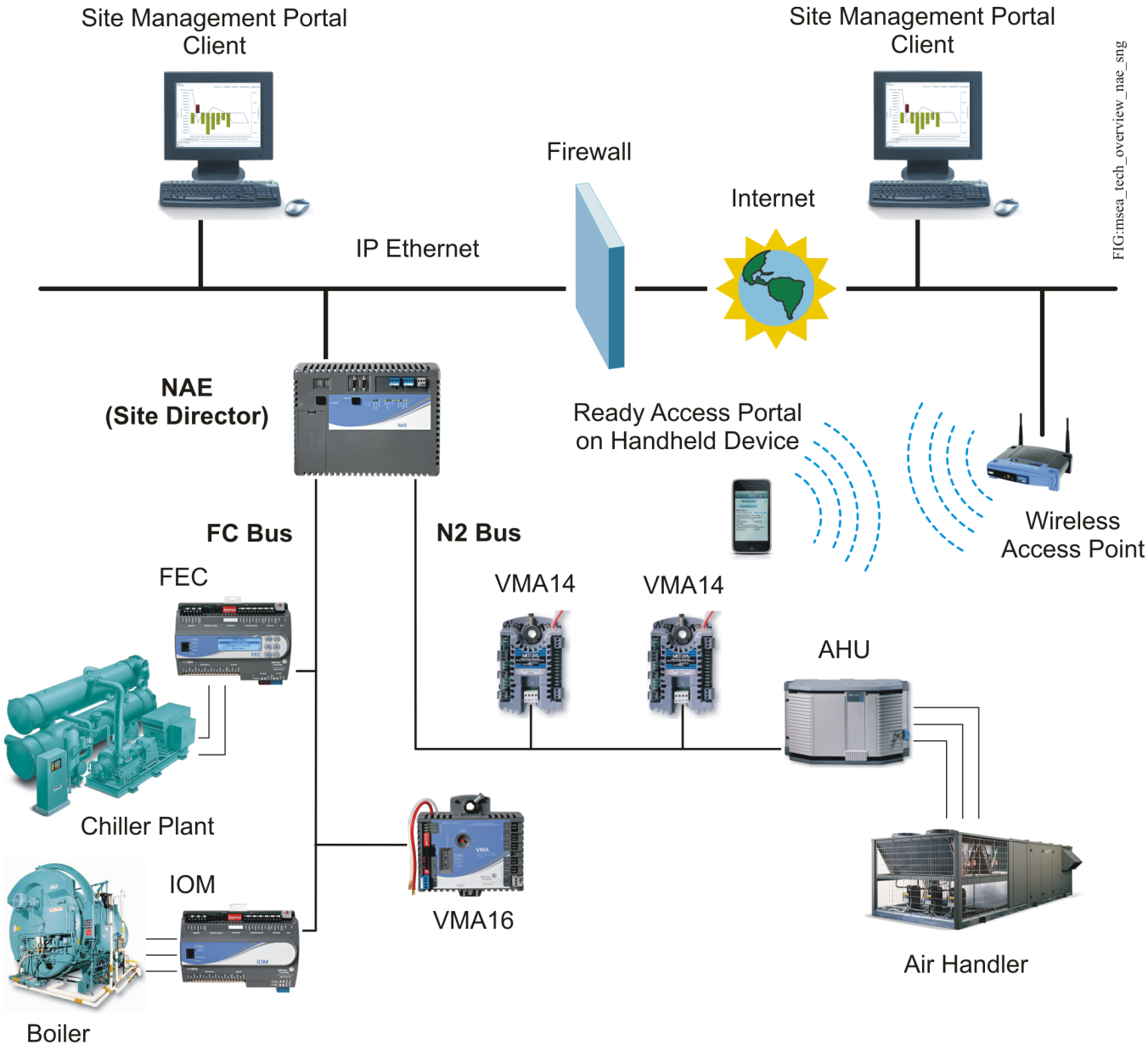
Single NAE System Configuration

Figure 2 shows a single NAE55 device attached to one N2 trunk and one MS/TP trunk. Once you complete the automated discovery process for both the N2 and MS/TP trunks, your system is ready to provide supervisory control and Web access to a maximum of four simultaneous users. Graphics access is included; however, it is limited to available storage on the NAE. The Site Management Portal UI can be accessed by connecting the NAE to an Ethernet network and adding a computer with a suitable browser on the network.

Note: This configuration only provides long-term storage of data through the use of the Export Utility installed on a computer.

Note: The NAE45-Lite requires an ADS-Lite-A Site Director. The NAE45-Lite cannot be a stand-alone engine on a network.

Figure 2: Single NAE Metasys Site Example



Multiple NAE System Configuration with One NAE Designated as the Site Director

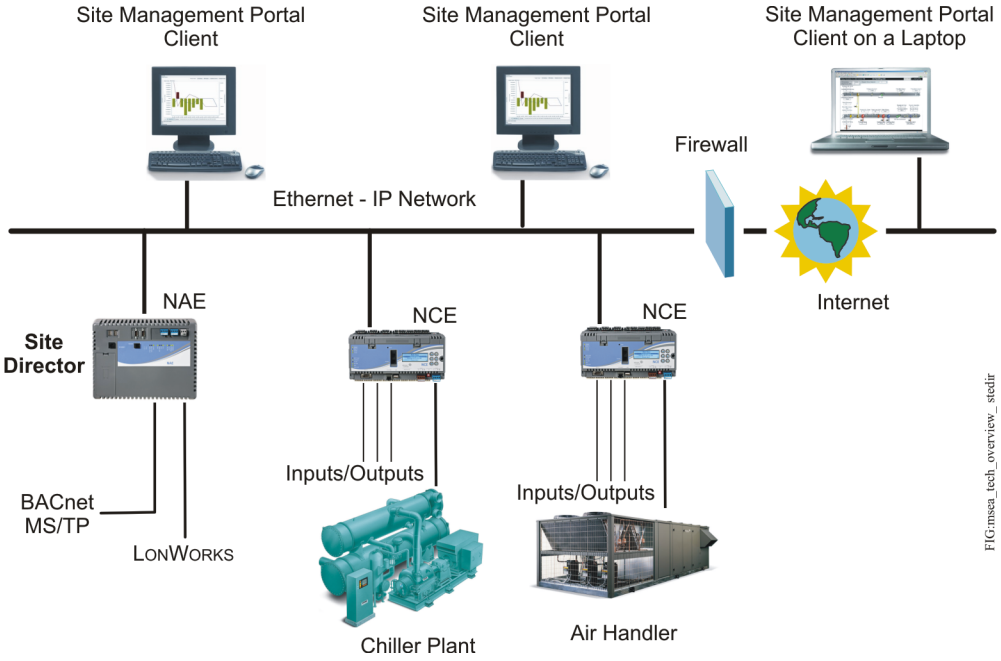
To extend the capabilities of your system, add one or more additional NAEs. In *Figure 3*, one NAE designated as the Site Director, provides the Site Management Portal to all devices on the site. This configuration supports up to four simultaneous users.

Note: The Site Director must contain the modem for a dial-up site.

Note: This configuration only provides long-term storage of data through the use of the Export Utility installed on a computer.

Note: The NAE45-Lite can be partnered with only other NAE45-Lite devices. Additionally, the NAE45-Lite requires an ADS-Lite-A Site Director.

Figure 3: Multiple NAE System Configuration with One NAE Designated as the Site Director

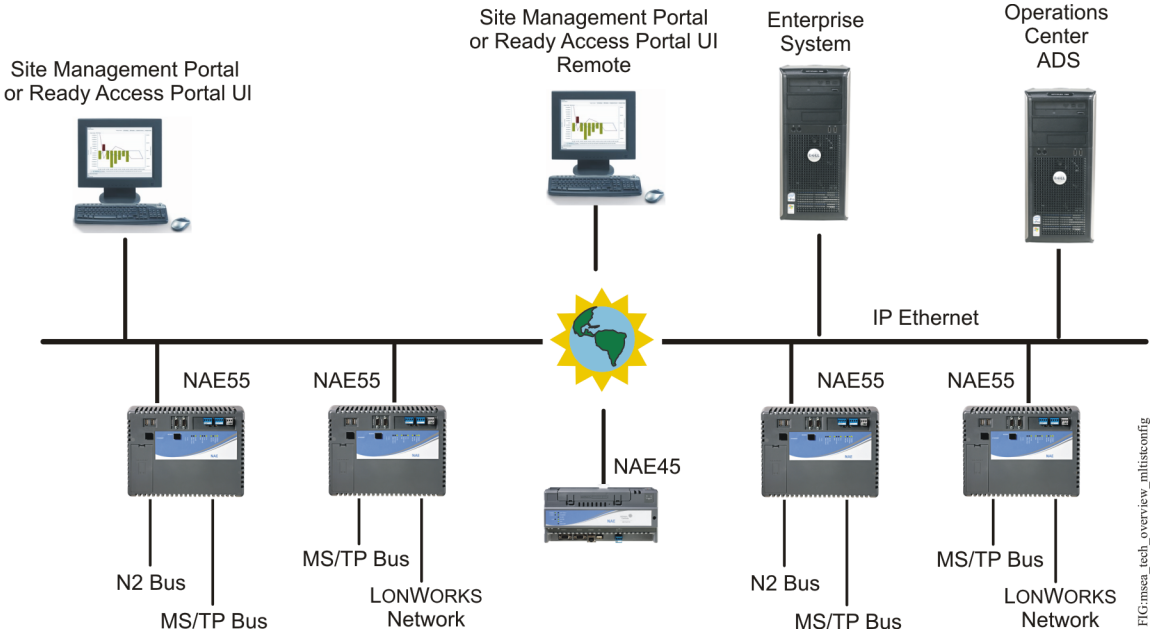


ADS/ADX Site Director with Multiple NAEs System Configuration

Sites that require more than four simultaneous users must add an ADS or ADX (*Figure 4*). If a large number of graphics are required to navigate through a site, the addition of the ADS/ADX allows access to a disk drive or network drive for graphic file storage. The ADS/ADX provides permanent storage of collected trend data samples, event messages, and audit trail messages routed from the NAE/NCE devices.

Note: The ADS-Lite is available in select markets and supports a subset of available Metasys system devices.

Figure 4: Multiple NAE System Configuration with ADS or ADX, and Ready Access Portal



Ready Access Portal Configuration

The Ready Access Portal software provides a natural, complementary extension of the Metasys Site Management Portal UI. The Ready Access Portal configuration includes a computer running the Ready Access Portal software, a Metasys Site Director, and a computer or handheld device for browsing to the Ready Access Portal UI. The example configuration in *Figure 4* shows a configuration with the Ready Access Portal Software installed on an ADS. Ready Access Portal software can also be installed on a computer on a standalone NAE network, allowing customers to log into Ready Access Portal from a computer or handheld device to get information from that engine. See other configuration drawings in this document for examples of Ready Access Portal software in networks.

ADX Split Configuration

The ADX split configuration provides the ADX software/user interface on one computer (the Web/Application server computer) and the alarm, audit, annotations, and historical trend data on another computer with Microsoft SQL Server software (the Database server computer). See *Figure 5*.

Note: The ADX split configuration can only be used if you have fewer than 50 NxEs on a site. For larger sites, use a unified ADX system.

Figure 5: ADX Split Configuration

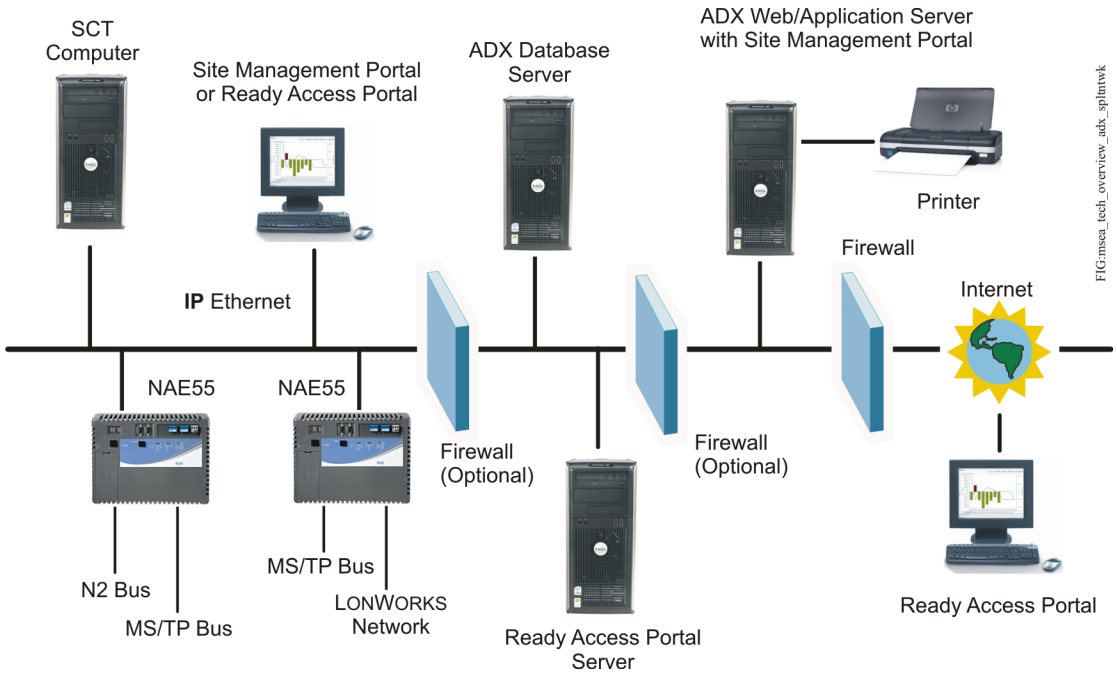
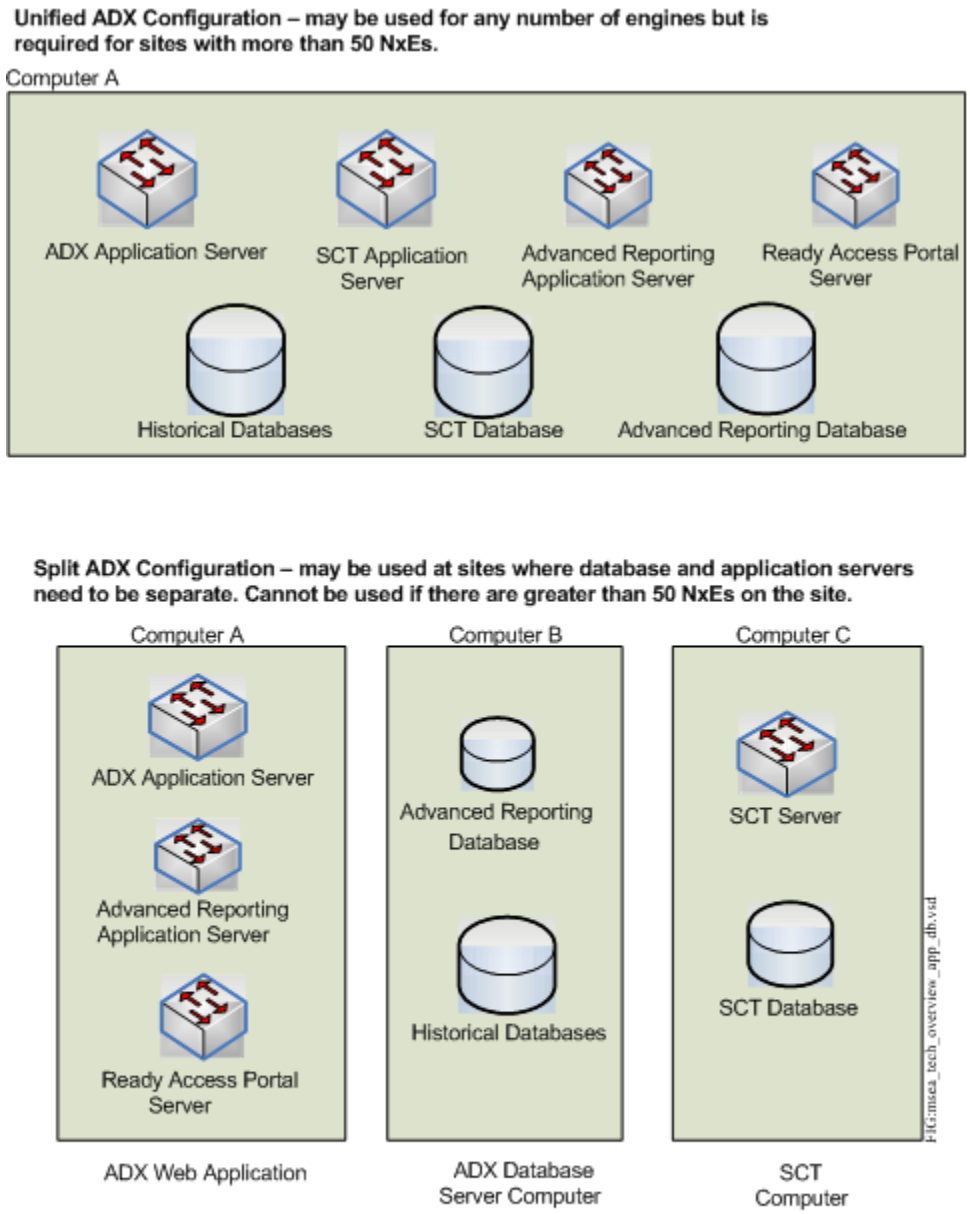


Figure 6 shows at a high level the difference between the unified and split ADX configurations. Since larger sites (over 50 NxEs) require a unified system be careful when deciding whether to use split or unified systems. For example, if you have a requirement to have your database server separate from your application servers you may want to use an ADX split configuration. However, if you may grow your site to have more than 50 NxEs, you should consider staying with a unified system since it can be difficult to change from a split to a unified system or from a unified to a split system.

Figure 6: Differences Between Unified and Split ADX Configurations



Note: All three computers used in a split ADX configuration should use the same version of SQL Server software.

Note: You can install the Ready Access Portal software on a stand-alone computer as well, but you cannot install the Ready Access Portal software on an SCT computer with simulation. Also, we do not support installing Ready Access Portal software on any ADS/ADX that is not a Site Director or on any NxE85 engine.

Large ADX Site Configuration

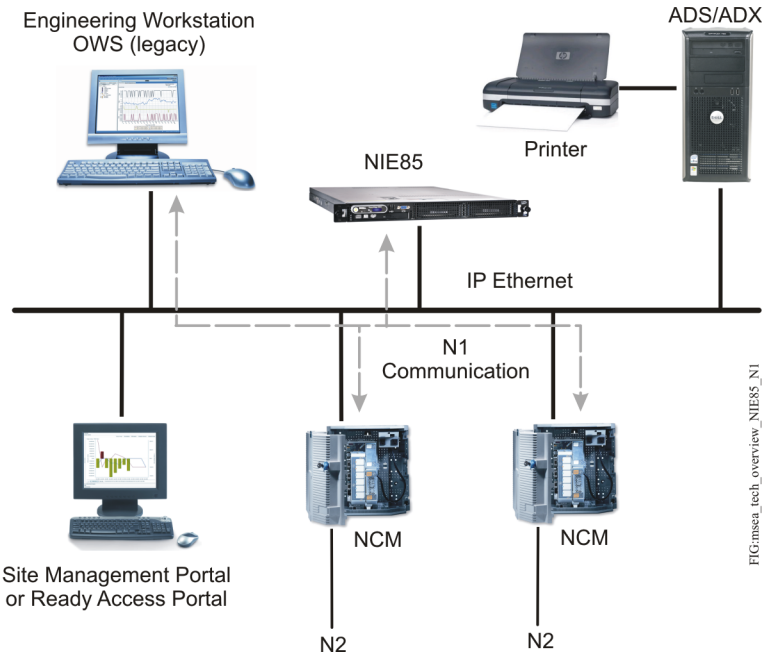
For a customer site that requires from 50 to 1,000 NxEs, we recommend an ADX configuration with a minimum of two separate servers - one serving as ADX Site Director and repository, and a second for use with configuration

tools, such as SCT and the NAE/NIE Update Tool. If the Ready Access Portal software is required, a third server is recommended to run the Ready Access Portal software. The ADX you select for a large site can be a 10-, 25-, or 50-user ADX. See *Extended Application and Data Server System Requirements (Unified 50 User ADX)* for the technical specifications for a large, Unified ADX system.

N1 Integration System Configuration

The NIE (NIE55 and NIE85) provides a means of migrating your existing Metasys N1 network to the Metasys system.

Figure 7: N1 Integration with NIE85



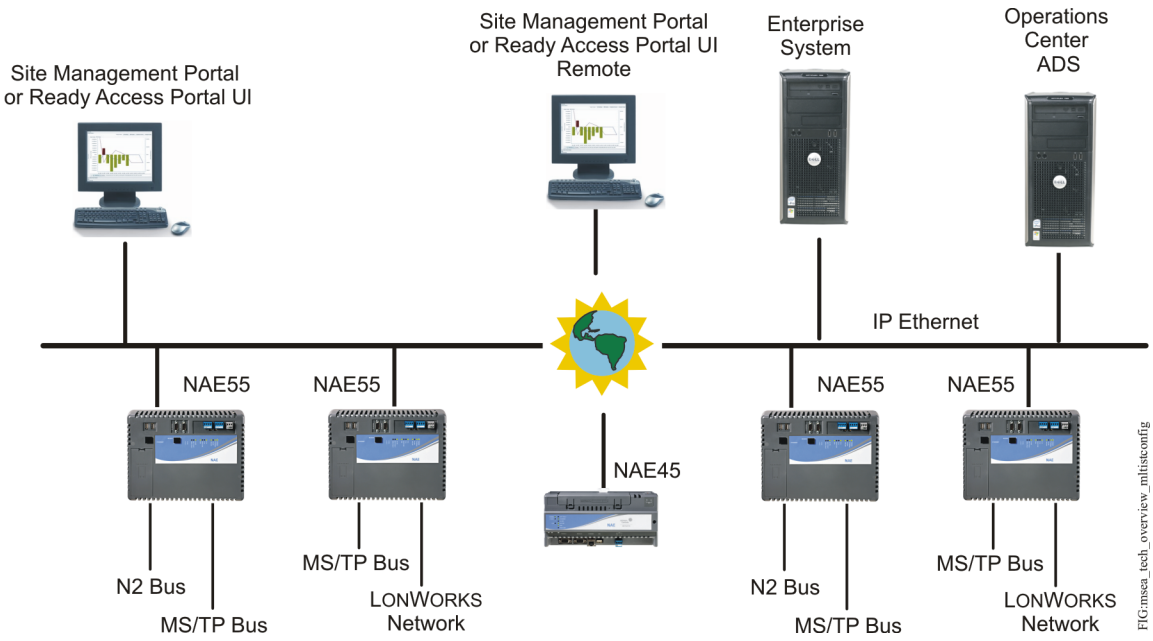
Multi-Location Configuration

Remote sites may be single or multiple NAE configurations, with or without a local ADS/ADX. The remote site may also be a Metasys N1 installation with one or more NIEs to integrate the site into the Metasys system.

The operations center for the multiple sites normally has an ADS connected to the enterprise IP network and is part of the VPN for access to the sites that are linked by a WAN. It also has modems to receive messages from small sites that only have telephone line access.

The application server receives and displays alarm and event messages to the operators and records their response actions. The server retrieves and stores all operational data from the remote buildings for review by management personnel. Enterprise business systems can access the data for further analysis. The building where the Operations Center is located may have its own BAS with a single or multiple NAEs. See *Figure 8*.

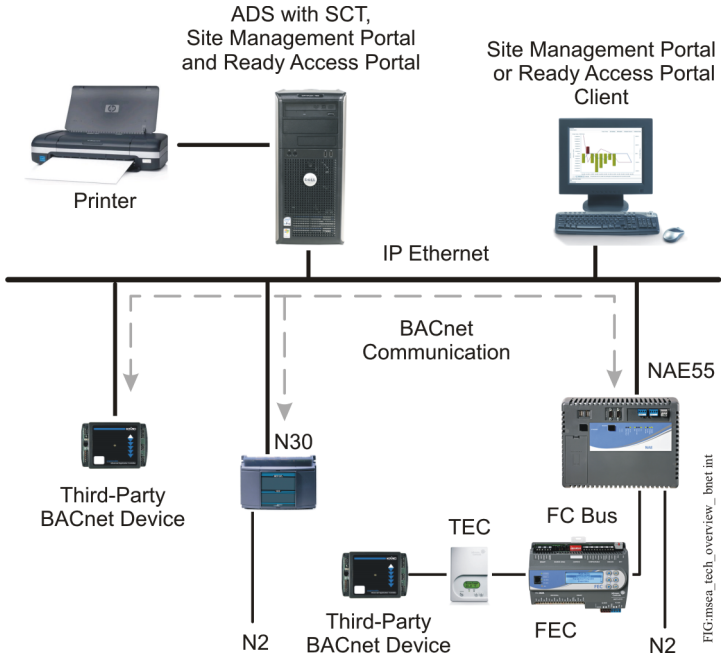
Figure 8: Multi-Location Configuration



BACnet IP Network System Configuration

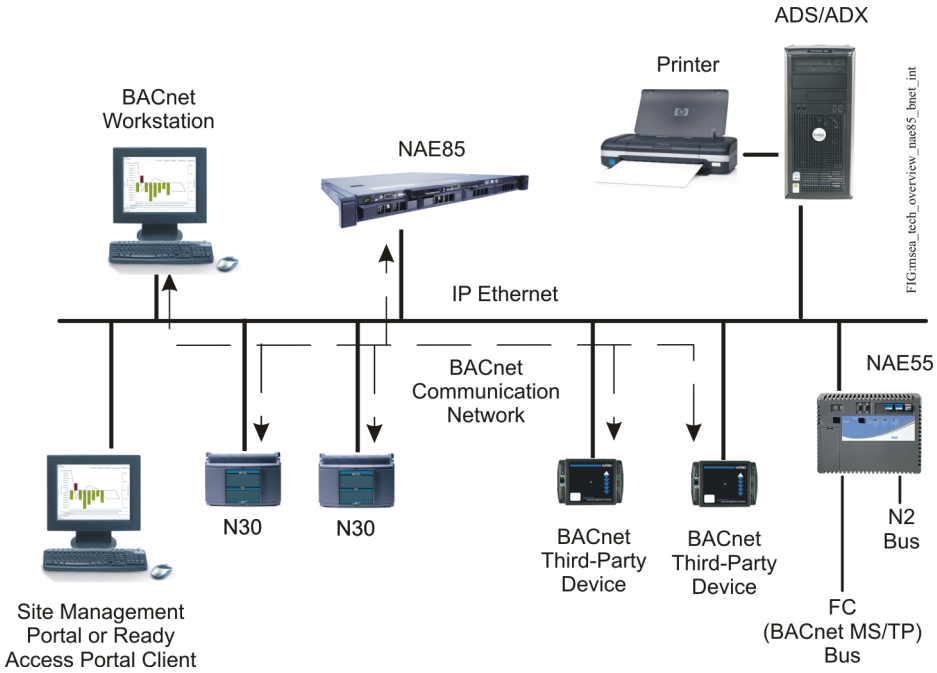
BACnet IP devices are connected directly to the IP Ethernet network. The NAE/NCE communicates with the devices using the BACnet protocol and presents the BACnet data to the system in the same way as the other data in the Metasys system. *Figure 9* shows the N30 supervisory controller integrated into the Metasys network. Other BACnet IP devices are integrated in the same way.

Figure 9: BACnet IP Network Integration System Configuration



The NAE85 allows integration of larger BACnet integration projects.

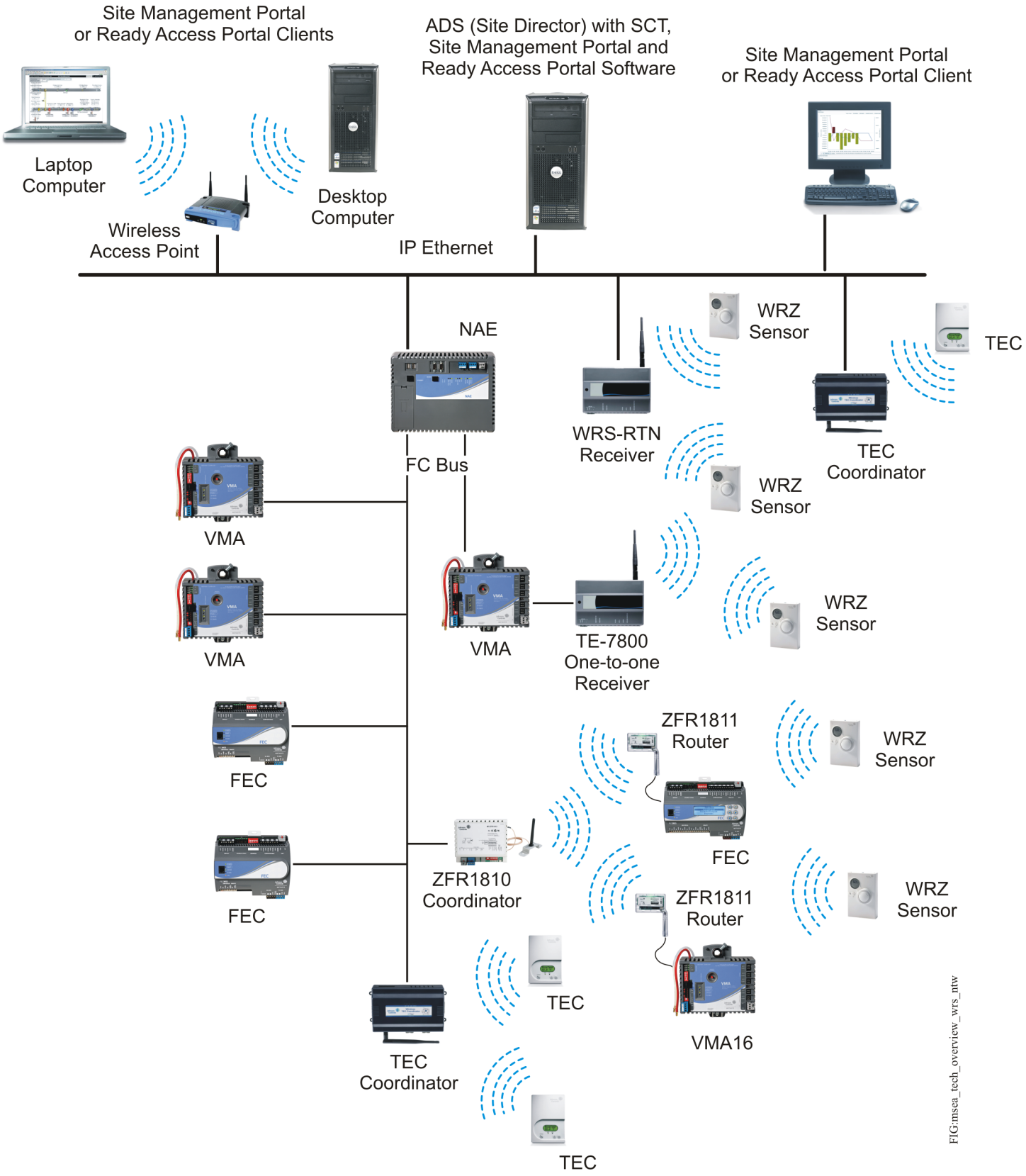
Figure 10: NAE85 BACnet Integration



Wireless Metasys System Configurations

Figure 11 shows various wireless Metasys system offerings, and how they coexist within the Metasys system.

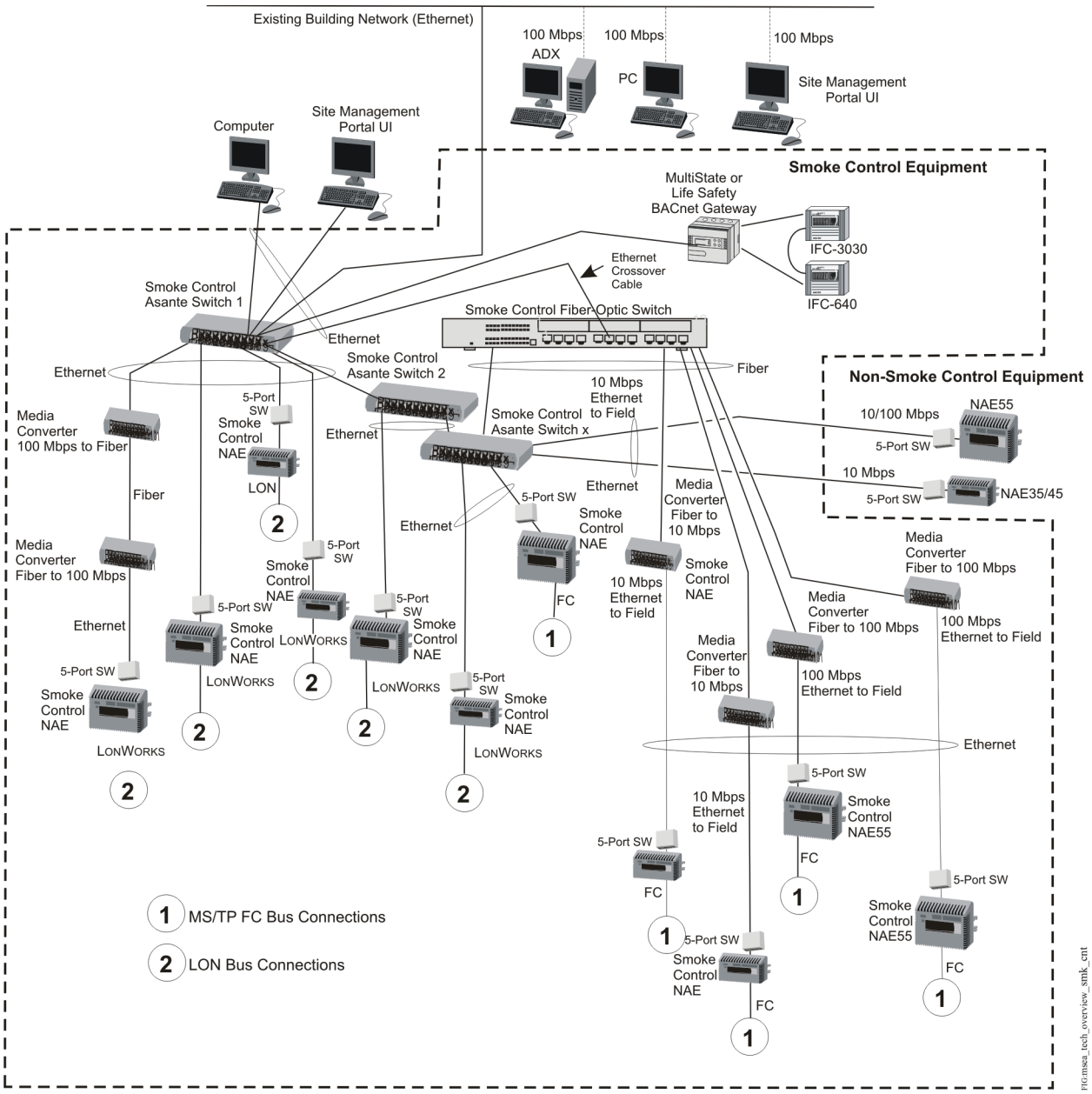
Figure 11: Wireless Metasys Systems



Smoke Control Application Configuration

Figure 12 shows a configuration that complies with the UL 864 UUKL Ninth Edition listing, incorporating smoke control and non-smoke control systems. *Figure 12* is only an example; the number and arrangement of components in your system may differ. Ensure that your system complies with all device and communication requirements and restrictions.

Figure 12: Metasys System UL864 UUKL Ninth Edition Smoke Control System



Performance Guidelines and Limitations

The following tables describe the recommendations and limitations of the various components of the Metasys system.

Site Director Limitations and Recommendations

Table 1 describes performance guidelines and limitations of the Metasys system site directors.

Note: Your site director should be at Metasys Release 6.0 and it is a best practice to upgrade your engines to the latest release if possible. Engines at Release 5.2 or later work well with Release 6.0. Engines at earlier versions should be upgraded as soon as possible for best performance.

Table 1: Site Director Limitations and Recommendations

Type of Site Director	NAE 35	NAE45	NxE55	NxE85	NCE25	ADS	ADS-Lite-E	ADS-Lite-A	ADX
Max. number of total engines and servers (including self for NxEs)	3	3	4	4	1	10 to 14	5 [1]	4 [2]	1000 [3]
Max. number of simultaneous Site Management Portal users	2	2	4	10	2	5	5	5	10/25 [4]
Max. number of dynamic values per graphics	100	100	100	100	100	100	100	100	100
Max. number of results displayed in a global search	500	500	500	500	500	2000	2000	2000	2000
Max. number of languages	1					14	14	14	14
Max. number of objects in entire system	3 million/ 750k (for ADX Site Director Only)								
Max. number of objects in device	2500	2500	5000	25000	2500	N/A	N/A	N/A	N/A
Max. number of objects within a single folder	300	300	700	700	300				
Max. number of characters in the name of an object	400								
Max. number of characters in the description of an object	40								
Max. number of nesting levels for object creation	7								
Max. number of extensions per object	10								

Table 1: Site Director Limitations and Recommendations

Type of Site Director	NAE 35	NAE45	NxE55	NxE85	NCE25	ADS	ADS-Lite-E	ADS-Lite-A	ADX
Max. number of sets for third-party BACnet states text	1000								
Max. number of characters for a third-party BACnet states text	60								
Max. number of members for a multi-value third-party BACnet states text	500								
Max. number of Site Management Portal user views	Limited only by memory capacity								
Max. number of simultaneous browsers per client computer	2								
Max. number of DLLR load extension	Limited only by memory capacity. If you plan to attach a large number of load extensions to a single DLLR object, consider the memory limitation. For load extensions attached to one DLLR object, there is a 64 KB text limit for the list of the Loads fully qualified references. Load Limit = (64 x 1024)/average number of characters per load. 1024 Bytes equals 1 KB. For example, if your DLLR object is configured with Loads that have fully qualified references that average 100 characters (including dots) in length, then you can support approximately 650 loads (64 x 1024/100) for that DLLR. If you reach the memory limit you may need to combine loads. For example, if a site has multiple physical meters, split the meters across multiple controllers and apply appropriate DLLR loads, if possible. Otherwise, use Interlock or Multiple Command objects to reduce the number of loads added to the DLLR.								

1 Supports up to 5 of the following: NAE35, NAE45, NCE25, and NIE29/39/49
2 Supports up to 3 NAE-Lite units plus up to 1 NIE29/39/49
3 Depends on computer hardware
4 Depends on version of ADX

Supervisory Controller Hardware Limitations

Table 2: Supervisory Controller Hardware Limitations

Description	NAE 35	NAE45	NAE45-Lite	NAE55	NIE55	NxE85	NCE25
Number of network trunks	1	1	1	2	2	0	MS-NCE2500-0 has 0, all other models have 1
Max. number of Metasys MS/TP devices on an FC Bus. Devices include FECs, FACs, VMAs, and IOMs	50	100	100	100	N/A	N/A	32

Table 2: Supervisory Controller Hardware Limitations

Description	NAE 35	NAE45	NAE45-Lite	NAE55	NIE55	NxE85	NCE25
Max. number of N2 devices per N2 trunk. Performance varies based on mix (N2 Open/Sys91/VMA)	50	100	100	100	N/A	N/A	32
Max. number of Metasys or third-party MS/TP devices that can be connected to an FC Bus when one or more TEC thermostat, variable speed drive, or third-party MS/TP devices are connected to the FC bus	32	64					32
Max. number of mapped N2 points per trunk	3,200 - Performance varies based on mix (N2 Open/Sys91/VMA). Recommend maximum for best performance is 1,000 points. The software definition limit is 3,200 points with no guarantee of acceptable performance.						
Max. number of LonWorks devices. Single Sub-net LonWorks network: does not support routers; supports physical repeaters	64	128	N/A	255	N/A	N/A	32
Max. number of LonWorks network variables	1,500	1,500	N/A	2,000	N/A	N/A	1,500
Max. number of BACnet IP devices, including N30s, and third-party devices		100	100	100	N/A	N/A	100
Max. time on battery backup	1,024 seconds						

Alarm and Trending Performance Guidelines

Description	NAE/NCE	ADS	ADX	Comments
Average max. number of alarms/events per hour	100		1,000	This number applies to alarms/events in originating from devices at Release 5.2 or later.
Max. number of alarms/events per day			48,000	Within 24 hour period. This number applies to alarms/events in originating from devices at Release 5.2 or later.
Average max. number of trend samples per hour	1,500	1,500	1,500	This number applies to alarms/events in originating from devices at Release 5.0 or later. The ADX supports one daily burst of 300k trends on one hour.

Description	NAE/NCE	ADS	ADX	Comments
Max. number of trend samples per day		540,000	2,600,000	Within 24 hour period. This number applies to alarms/events in originating from devices at Release 5.0 or later.
Max. number of stored trend samples		Limited only by SQL storage capacity		

Note: Alarms and trends from FACs connected to any of these contribute to the overall totals.

MS/TP Performance Guidelines

Performance Rating	COV Rate	Token Loop Time
Low	> 500 messages per minute	> 3,000 ms
Medium	Between 400 and 500 messages per minute	Between 2,000 and 3,000 ms
High	< 400 messages per minute	< 2,000 ms

SCT Limitations

Description	Supported	Comments
Max. number of simultaneous users	1	
Max. number of concurrently active archives	10	
Max. size of an active database or project in SCT	10 GB	Using supported Microsoft SQL Server Express 2008
	No Limit	Using supported Microsoft SQL Server Software

Ready Access Portal Limitations

Description	ADS (on Windows XP or 7)	ADX	NxE
Maximum number of concurrent users on the Ready Access Portal UI where the software is installed on a stand-alone computer	8	100	8
Maximum number of concurrent users on the Ready Access Portal UI where the software is installed on a Site Director ADS/ADX	5	10, 25, or 50 User depending on the version of ADX purchased	N/A

FAC Integration Considerations

The local FAC trend and alarm and event setup strategy should first focus on needs during a stand-alone commissioning session using CCT. The integration of an FAC's trends and alarm and events is governed by the NxE guidelines for trend and alarm/event integrations.

The recommended limit threshold for trend samples for an NxE is 1500 samples per hour. Therefore, the total number of trend samples forwarded from all FACs integrated to an NxE should use this same guideline during the setup of the local FAC trends.

The recommended limit threshold for alarm and event samples for an NxE is 100 events per hour. The decision to set up the alarms in all FACs for use as BACnet Alarm extensions in the NxE should be limited to only the points that normally are created as extensions in the NxEs. From a consistency standpoint, the use of the BACnet Alarm extensions versus the Metasys Alarm extensions should also be taken into consideration when deciding if the FAC's BACnet Alarms should be enabled at the NxE.

In the following examples, we show acceptable limits with the following setups:

- 5 FACs with 6 alarms per hour plus 1 NAE with 30 alarms per hour (*Table 3*)
- 5 FACs with 200 trend samples per hour plus 1 NAE with 500 trend samples per hour (*Table 4*)
- 5 FACs with 10 COVs per minute plus 35 FECs with 10 COVs per minute *Table 5*)

Table 3: Example 1

Setup	Alarms per Hour
5 FAC with 6 alarms/hour each	30 alarms per hour
1 NAE	30 alarms per hour
Total	60 alarms per hour

Table 4: Example 2

Setup	Trend Samples per Hour
5 FAC with 200 trend samples per hour each	1,000 trend samples per hour
1 NAE	500 trend sample per hour
Total	1,500 trend samples per hour

Table 5: Example 3

Setup	COVs per Minute
5 FACs with 10 COVs/minute	50 COVs per minute
35 FECs with 10 COVs/minute	350 COVs per minute
Total	400 COVs per minute

For trend creations in the FAC, the use of faster sample intervals of key points provides a more intuitive troubleshooting interface in a CCT commissioning session via the CCT's trend viewer. Setting up the trends for local use in CCT does not mean that the same points and sample intervals have to be utilized in the NxE integration. The trends created in the FAC do not have to be discovered and used by the NxEs; separate trends extensions can still be added at the NxE for any points that have FAC based trends created.

For alarm enables in the FAC, the use of the FAC's local event viewer should be taken into consideration to provide a more intuitive troubleshooting interface during a CCT commissioning session. The FAC holds the 100 most recent alarms/events in its local memory.

Technical Specifications and Requirements

Hardware Configuration Requirements

Our suggested minimum hardware configuration is based upon experience and testing for both client and server platforms. These configurations are only suggestions and are not meant to imply that older or slower machines are not usable.

Systems with less memory, smaller hard disks, or that are generally slower may have acceptable performance for basic operations. These systems may also be acceptable when not called upon to operate simultaneous tasks that require hardware or network resources. Memory intensive applications may require additional memory for proper performance. Examples of these optional or advanced features of the Metasys system include navigation and support for complex graphics, operation with the maximum number of users, complex and extended queries with the Export Utility, support for large network integrations, and large numbers of concurrent open windows.

When deciding on computer hardware, consider the following important factors:

- Overall system performance is highly dependent on the total amount of available computer RAM. If you experience performance issues with the ADS or ADX, increase the total amount of RAM.
- Do not mix a 64-bit operating system with a 32-bit version of SQL Server software. Both the operating system and the SQL Server software must be either 64-bit or 32-bit.
- A 32-bit operating system can support no more than 4 Gb RAM.
- Only computers with one physical processor are supported to run Metasys software. However, a single processor with a dual- or quad-core is supported.
- For improved performance, consider Serial Attached SCSI (SAS) hard drives over Serial AT Attachment (SATA) hard drives.
- Dell and HP are the preferred computer manufacturers. They offer machines that match the hardware recommendations listed in this document.
- For very large ADX systems (50 users or more), run the ADX on a separate computer from the Ready Access Portal.
- Do not enable power saving modes on the ADS or ADX computer. Such modes automatically turn off disk drives and network cards, thereby adversely affecting proper Metasys system operation.
- Remember to obtain Windows operating system Client Access Licenses (CALs) for the total number of users and devices on your system. The total number of CALs required is equal to the total number of users plus the total number of NxEs connecting to the Metasys ADX. (The ADS and ADS-Lite do not require separately purchased CALs.) Refer to the *Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279)* or the *Network and IT Considerations for the IT Professional Technical Bulletin (LIT-1201578)* for more information on CALs.

Computer Requirements for Site Management Portal Client Computer

Table 6 and *Table 7* describe the recommended and minimum computer requirements for the computer used for Site Management Portal access.

Table 6: Site Management Portal Desktop Client Computer Requirements

Component	Description
Recommended Processor[1]	2.8 GHz or higher Pentium® 4 processor (2.0 GHz Pentium 4 processor minimum)
Recommended Random Access Memory (RAM)	4 GB (1 GB minimum)[2]
Hard Disk Capacity	40 GB hard disk (minimum)
Supported Operating System	Windows® 7 OS (32-bit or 64-bit) with SP1
	Windows XP® OS (32-bit) with SP3
Required Web Browser Software for Metasys Client Computers	Windows Internet Explorer® Version 8.0 or 9.0 (Other popular browsers, such as Google Chrome and Mozilla Firefox, may also be used but are not fully supported.) **Note:** You use the web browser to download the Launcher application. After you install the Launcher application, you use the Launcher, not the web browser, to log on to the Metasys UI.
Monitor	1024 x 768 or higher resolution and 16-bit or higher color depth

1 Our computer platform and memory recommendations are not meant to imply that older or slower machines are not usable. Refer to the *Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279)* for more information regarding computer/server recommendations.
2 Af you use graphics intensively, you may experience better computer performance with additional RAM.

Table 7: Site Management Portal Laptop Client Computer Requirements

Component	Description
Recommended Processor[1]	1.8 GHz or higher Pentium® 4 processor (800 MHz Pentium 4 processor minimum)
Recommended Random Access Memory (RAM)	4 GB (1 GB minimum)[2]
Hard Disk Capacity	40 GB hard disk (minimum)
Supported Operating System	Windows® 7 OS (32-bit or 64-bit) with SP1
	Windows XP® OS (32-bit) with SP3
Required Web Browser Software for Metasys Client Computers	Windows Internet Explorer® Version 8.0 or 9.0 (Other popular browsers, such as Google® Chrome and Mozilla Firefox, may also be used but are not fully supported.) **Note:** You use the web browser to download the Launcher application. After you install the Launcher application, you use the Launcher, not the web browser, to log on to the Metasys UI.

1 Our computer platform and memory recommendations are not meant to imply that older or slower machines are not usable. Refer to the *Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279)* for more information regarding computer/server recommendations.
2 If you use graphics intensively, you may experience better computer performance with additional RAM.

Note: The Microsoft Windows 7 Operating System (OS) does not support browsing to applications with Java Runtime Environment (JRE) version 1.6.0_15 or earlier. If the client computer you use to browse to Metasys systems has a Windows 7 OS, you may not be able to connect directly and browse to some of the older Metasys devices on your Metasys systems.

Application and Data Server (ADS) System Requirements

Table 8: Application and Data Server (ADS) System Requirements (5 Users)

Recommended Computer Platform[1]	2.8 GHz Intel Core 2 Duo processor 2 x 320 GB hard disk (RAID 1)[2] with 40 GB free space after installation of all prerequisite software and before installation of ADS software. Configure RAID 1 (mirroring) with disk write-caching turned on. DVD drive **Note:** Prerequisite software includes the supported OS, database software, .NET Framework, and any other software or service packs required for your ADS configuration.	
	Graphics card (1 GB RAM, ATI® Technologies or NVIDIA® Corporation, 64-bit compatible [for 64-bit OS], Small Form Factor [SFF] if required)[3]	
Recommended Memory[4]	4 GB RAM (32-bit systems)	
	8 to 16 GB RAM (64-bit systems)	
Supported Operating Systems[5] **and Database Software**	**Windows® 7 OS Professional, Enterprise, and Ultimate Editions with SP1 (32-bit or 64-bit)** (Includes Microsoft IIS Version 7.5) Supports Microsoft SQL Server™ 2008 R2 Express software with SP2 (32-bit or 64-bit) or SQL Server 2008 Express software with SP3 (32-bit)	
	Windows XP® OS Professional Edition with SP3 (32-bit) (Includes Microsoft IIS Version 5.1) Supports Microsoft SQL Server 2008 R2 Express software with SP2 (32-bit) or SQL Server 2008 Express software with SP3 (32-bit)	
Required Web Browser Software for Metasys Client Computers	Windows Internet Explorer® Version 8.0 or 9.0 (Other browsers, such as Google Chrome and Mozilla Firefox®, may also be used but are not fully supported.) **Note:** You use the web browser to download the Launcher application. After you install the Launcher application, you use the Launcher, not the web browser, to log on to the Metasys UI.	
Network Communication	Ethernet network interface card (100 or 1000 Mbps) **Note:** The ADS supports only one network interface card.	
Additional Software Included with the ADS	CCT software	Launcher software
	Export Utility software	Microsoft SQL Server 2008 R2 Express software with SP2 (32-bit and 64-bit)
	Metasys Database Manager software	Microsoft SQL Server 2008 Express software with SP3
	Ready Access Portal software	Microsoft .NET Framework Version 3.5 SP1
	SCT software	SCT Manager software

Table 8: Application and Data Server (ADS) System Requirements (5 Users)

Optional Hardware	Any network or local printer supported by the qualified Windows operating system
Optional Software	Energy Essentials Graphic Generation Tool

1 Our computer platform and memory recommendations are not meant to imply that older or slower machines are not usable. Refer to the *Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279)* for more information regarding computer/server recommendations.
2 For best performance, use Serial Attached SCSI (SAS) hard drives, not Small Computer System Interface (SCSI) hard drives.
3 For improved performance in configurations where ADS and Ready Access Portal share the same computer.
4 For best performance, use the maximum amount of memory that the computer allows.
5 Refer to the *Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-1201279)* for specific Microsoft Windows OS settings that may be required for your Metasys system configuration.

Application and Data Server-Lite System Requirements

Table 9: Application and Data Server-Lite System Requirements

Recommended Computer Platform [1]	2.8 GHz Intel Core 2 Duo processor 2 x 320 GB hard disk (RAID 1)[2] with 40 GB free space after installation of all prerequisite software and before installation of ADS-Lite software. Configure RAID 1 (mirroring) with disk write-caching turned on. **Note:** Prerequisite software includes the supported OS, database software, .NET Framework, and any other software or service packs required for your ADS configuration. DVD drive Graphics adapter (Graphics adapter (1 GB RAM, ATI® Technologies or NVIDIA® Corporation, 64-bit compatible (for 64-bit OS), Small Form Factor (SFF) if required)[3]
Recommended Memory	4 GB RAM minimum (32-bit systems) 8 GB RAM minimum (64-bit systems)
Supported Operating Systems[4] **and Database Software**	**Windows® 7 OS Professional, Enterprise, and Ultimate Editions with SP1 (32-bit or 64-bit)** (Includes Microsoft® IIS Version 7.5) Supports Microsoft SQL Server™ 2008 R2 Express software with SP2 (32-bit or 64-bit) or SQL Server 2008 Express software with SP3 (32-bit)
	Windows XP® OS Professional Edition with SP3 (32-bit) (Includes Microsoft IIS Version 5.1) Supports Microsoft SQL Server 2008 R2 Express software with SP2 (32-bit) or SQL Server 2008 Express software with SP3 (32-bit)
Required Web Browser for Metasys Client Computers	Windows Internet Explorer® Version 8.0 or 9.0 (Other browsers, such as Google® Chrome and Mozilla Firefox, may also be used but are not fully supported.) **Note:** You use the web browser to download the Launcher application. After you install the Launcher application, you use the Launcher, not the web browser, to log on to the Metasys UI.
Network Communication	Ethernet network interface card (100 or 1000 Mbps) **Note:** The ADS supports only one network interface card.

Table 9: Application and Data Server-Lite System Requirements

Additional Software Included with the ADS-Lite	CCT software	Launcher software
	Export Utility software	Microsoft SQL Server 2008 R2 Express software with SP2 (32-bit and 64-bit)
	Metasys Database Manager software	Microsoft SQL Server 2008 Express software with SP3
	Ready Access Portal software	Microsoft .NET Framework Version 3.5 SP1
	SCT software	
Optional Hardware	Any network or local printer supported by the qualified Windows operating system	
Optional Software	Graphic Generation Tool	

1 Our computer platform and memory recommendations are not meant to imply that older or slower machines are not usable. Refer to the *Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279)* for more information regarding computer/server recommendations.
2 For best performance, use Serial Attached SCSI (SAS) hard drives, not Small Computer System Interface (SCSI) hard drives.
3 For improved performance only when ADS and Ready Access Portal share the same computer.
4 Refer to the *Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279)* for specific Microsoft Windows OS settings that may be required for your Metasys system configuration.

Extended Application and Data Server System Requirements (Unified ADX)

Table 10: Extended Application and Data Server System Requirements (Unified ADX Systems, 10 or 25 Users)

Recommended Server Platform[1]	2.4 GHz Intel Xeon® single processor 2 x 600 GB hard disk (RAID 1)[2] with 40 GB free space after installation of all prerequisite software and before installation of ADS software. Configure RAID 1 (mirroring) with disk write-caching turned on. DVD drive **Note:** ADX prerequisite software includes the Windows OS, SQL Server software, Windows .NET Framework, and any other software or SPs required by your ADX configuration.
Recommended Memory[3]	16 GB RAM (10 or 25 user ADX)
Supported Operating Systems[4] **and Database Software** [5]	**Windows Server 2008 R2 OS (64-bit) with SP1** (Includes Microsoft IIS Version 7.5) Supports Microsoft SQL Server™ 2008 R2 Standard and Enterprise software with SP2 (64-bit) or Microsoft SQL Server 2008 Standard and Enterprise software with SP3 (64-bit)
	Windows Server 2008 OS (32-bit) with SP2 (Includes Microsoft IIS Version 7.0) Supports Microsoft SQL Server 2008 R2 Standard and Enterprise software with SP2 (32-bit) or SQL Server™ 2008 Standard and Enterprise software with SP3 (32-bit) **Note:** A 32-bit OS only supports a maximum of 4 GB memory. For best performance, use a 64-bit OS.
Required Web Browser Software for Metasys Client Computers	Windows Internet Explorer® Version 8.0 or 9.0 (Other browsers, such as Google Chrome and Mozilla Firefox, may also be used but are not fully supported.) **Note:** You use the web browser to download the Launcher application. After you install the Launcher application, you use the Launcher, not the web browser, to log on to the Metasys UI.

Table 10: Extended Application and Data Server System Requirements (Unified ADX Systems, 10 or 25 Users)

Network Communication	Ethernet network interface card (100 or 1000 Mbps) **Note:** The ADX supports only one network interface card.	
Additional Software Included with the ADX	CCT software	Launcher software
	Export Utility software	Microsoft SQL Server 2008 R2 Express software with SP2 (32-bit and 64-bit)
	Metasys Database Manager software	Microsoft SQL Server 2008 Express software with SP3
	Ready Access Portal software	Microsoft .NET Framework Version 3.5 SP1
	SCT software	SCT Manager software
	Note: The Metasys Advanced Reporting System requires an ADX. The SCT computer must be online and accessible to the ADX at all times.	
Optional Hardware	Any network or local printer supported by the qualified Windows operating system	
Optional Software	Energy Essentials software Graphic Generation Tool software	

1 Our computer platform and memory recommendations are not meant to imply that older or slower machines are not usable. Refer to the *Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279)* for more information regarding computer/server recommendations.
2 For best performance, use SAS hard drives, not SATA hard drives.
3 For best performance, use the maximum amount of memory. An ADX with 16 GB RAM has much greater performance than an ADX with only 4 GB RAM. A 32-bit OS does not support more than 4GB of RAM.
4 Refer to the *Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279)* for specific Microsoft Windows OS settings that may be required for your Metasys system configuration.
5 You must purchase a SQL Server software license for each individual processor you have. You do not need to purchase multiple licenses if you have a single processor divided into multiple cores. For example, if you have a single processor with dual cores, purchase one license for SQL Server software.

Extended Application and Data Server System Requirements (Split ADX)

Table 11: Extended Application and Data Server System Requirements (Split ADX Systems, 10 or 25 Users, 50 Users Not Supported)

Recommended Server Platform[1]	**Web/Application Server** 2.4 GHz Intel Xeon® single processor 2 x 600 GB hard disk (RAID 1)[2] with 40 GB free space after installation of all prerequisite software[4] and before installation of ADS software. Configure RAID 1 (mirroring) with disk write-caching turned on. DVD drive
	Database Server 2.4 GHz Intel Xeon® single processor 2 x 600 GB hard disk (RAID 1) with 40 GB free space after installation of all prerequisite software[4] and before installation of ADS software. Configure RAID 1 (mirroring) with disk write-caching turned on. DVD drive
	SCT Computer In a split configuration, you cannot install SCT software on either the web/application server computer or the database server computer. Refer to the *System Configuration Tool Catalog Page (LIT-1900198)* for current SCT computer requirements.
Recommended Memory[3]	16 GB RAM (web/application server and database server for 10 or 25 user ADX)

Table 11: Extended Application and Data Server System Requirements (Split ADX Systems, 10 or 25 Users, 50 Users Not Supported)

Supported Operating Systems[5,6] with Supported Database Software[7]	**Windows Server 2008 R2 OS (64-bit) with SP1** (Includes Microsoft IIS Version 7.5) Supports Microsoft SQL Server™ 2008 R2 Standard and Enterprise software with SP1 (64-bit) or Microsoft SQL Server 2008 Standard or Enterprise software with SP3 (64-bit)	
	Windows Server 2008 OS (32-bit) with SP2 (Includes Microsoft IIS Version 7.0) Supports Microsoft SQL Server 2008 R2 Standard and Enterprise software with SP1 (32-bit) or SQL Server™ 2008 Standard and Enterprise software with SP3 (32-bit) **Note:** A 32-bit OS only supports a maximum of 4 GB memory. For best performance, use a 64-bit OS.	
Required Web Browser Software for Metasys Client Computers	Windows Internet Explorer® Version 8.0 or 9.0 (Other browsers, such as Google Chrome and Mozilla Firefox, may also be used but are not fully supported.) **Note:** You use the web browser to download the Launcher application. After you install the Launcher application, you use the Launcher, not the web browser, to log on to the Metasys UI.	
Network Communication	Ethernet network interface card (100 or 1000 Mbps) Note: The ADX supports only one network interface card.	
Additional Software Included with the ADX	CCT software	Launcher software
	Export Utility software	Microsoft SQL Server 2008 R2 Express software with SP2 (32-bit and 64-bit)
	Metasys Database Manager software	Microsoft SQL Server 2008 Express software with SP3
	Ready Access Portal software	Microsoft .NET Framework Version 3.5 SP1
	SCT software	
	Note: The Metasys Advanced Reporting System requires an ADX. The SCT computer must be online and accessible to the ADX at all times.	
Optional Hardware	Any network or local printer supported by the qualified Windows operating system.	
Optional Software	Energy Essentials software Graphic Generation Tool software	

1 Our computer platform and memory recommendations are not meant to imply that older or slower machines are not usable. Refer to the *Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279)* for more information regarding computer/server recommendations.
2 For best performance, use SAS hard drives, not SATA hard drives.
3 For best performance, use the maximum amount of memory. An ADX with 16 GB RAM has much greater performance than an ADX with only 4 GB RAM. Also, a 32-bit OS only supports a maximum of 4 GB of RAM.
4 ADX prerequisite software includes the Windows OS and SQL Server software, Windows .NET Framework, and any other software or service packs required for your ADX configuration.
5 The web/application and database servers must have the same OS installed.
6 Refer to the *Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279)* for specific Microsoft Windows OS settings that may be required for your Metasys system configuration.
7 You must purchase a SQL Server software license for each individual processor you have. You do not need to purchase multiple licenses if you have a single processor divided into multiple cores. For example, if you have a single processor with dual cores, purchase one license for SQL Server software.

Extended Application and Data Server System Requirements (Unified 50 User ADX)

Table 12: Extended Application and Data Server System Requirements (Unified ADX Systems, 50 Users)

Recommended Server Platform[1]	2.4 GHz Intel Xeon® single processor 6 x 300 GB hard disk (RAID 5)[2] with 50 GB free space after installation of all prerequisite software and before installation of ADS software. Configure RAID 5 with disk write-caching turned on. DVD drive **Note:** ADX prerequisite software includes the Windows OS, SQL Server software, Windows .NET Framework, and any other software or SPs required by your ADX configuration.	
Recommended Memory	32 GB RAM	
Supported Operating Systems[3] **and Database Software** [4]	**Windows Server 2008 R2 OS (64-bit) with SP1** (Includes Microsoft IIS Version 7.5) Supports Microsoft SQL Server™ 2008 R2 Standard and Enterprise software with SP2 (64-bit) or Microsoft SQL Server 2008 Standard and Enterprise software with SP3 (64-bit)	
	Windows Server 2008 OS (32-bit) with SP2 (Includes Microsoft IIS Version 7.0) Supports Microsoft SQL Server 2008 R2 Standard and Enterprise software with SP2 (32-bit) or SQL Server™ 2008 Standard and Enterprise software with SP3 (32-bit) **Note:** A 32-bit OS only supports a maximum of 4 GB memory. For best performance, use a 64-bit OS.	
Required Web Browser Software for Metasys Client Computers	Windows Internet Explorer® Version 8.0 or 9.0 (Other browsers, such as Google Chrome and Mozilla Firefox, may also be used but are not fully supported.) **Note:** You use the web browser to download the Launcher application. After you install the Launcher application, you use the Launcher, not the web browser, to log on to the Metasys UI.	
Network Communication	Ethernet network interface card (1000 Mbps) **Note:** The ADX supports only one network interface card.	
Additional Software Included with the ADX	CCT software	Launcher software
	Export Utility software	Microsoft SQL Server 2008 R2 Express software with SP2 (32-bit and 64-bit)
	Metasys Database Manager software	Microsoft SQL Server 2008 Express software with SP3
	Ready Access Portal software	Microsoft .NET Framework Version 3.5 SP1
	SCT software	
	Note: The Metasys Advanced Reporting System requires an ADX. The SCT computer must be online and accessible to the ADX at all times.	

Table 12: Extended Application and Data Server System Requirements (Unified ADX Systems, 50 Users)

Optional Hardware	Any network or local printer supported by the qualified Windows operating system.
Optional Software	Energy Essentials software Graphic Generation Tool software

1 Our computer platform and memory recommendations are not meant to imply that older or slower machines are not usable. Refer to the *Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279)* for more information regarding computer/server recommendations.
2 For best performance, use SAS hard drives, not SATA hard drives.
3 Refer to the *Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279)* for specific Microsoft Windows OS settings that may be required for your Metasys system configuration.
4 You must purchase a SQL Server software license for each individual processor you have. You do not need to purchase multiple licenses if you have a single processor divided into multiple cores. For example, if you have a single processor with dual cores, purchase one license for SQL Server software.

SCT Technical Specifications

For applications where SCT is installed on an ADS/ADX, refer to the specifications in the *Application and Data Server (ADS/ADX) Product Bulletin (LIT-1201525)*.

Table 13: System Configuration Tool System Requirements

Product Code	**MS-SCTSWO-0**
Recommended Computer/Server Platform[1]	Intel® Core™ 2 Duo E6700 or better (Intel Core 2 Duo E4300 minimum) 20 GB free hard disk space available (600 MB minimum) DVD drive
Recommended Memory[1]	Computer Platforms: 2 GB RAM (1 GB RAM minimum) Server Platforms: 4 GB RAM (2 GB RAM minimum)

Table 13: System Configuration Tool System Requirements

Product Code	MS-SCTSWO-0
Supported Operating Systems and Database Software[2]	**Windows® 7 OS Professional, Enterprise, and Ultimate Editions (32-bit) with SP1** (Includes Microsoft IIS Version 7.5) Supports Microsoft SQL Server™ 2008 R2 Express software, SQL Server™ 2008 Express software with SP2, or SQL Server™ 2005 Express software with SP3
	Windows XP® OS Professional Edition (32-bit) with SP3 (Includes Microsoft IIS Version 5.1) Supports Microsoft SQL Server™ 2008 R2 Express software, SQL Server™ 2008 Express software with SP2, or SQL Server™ 2005 Express software with SP3
	Windows Server 2008 R2 OS (64-bit) (Includes Microsoft IIS Version 7.5) Supports Microsoft SQL Server™ 2008 R2 Standard and Enterprise software (64 bit)
	Windows Server 2008 OS (32-bit) with SP2 (Includes Microsoft IIS Version 7.0) Supports Microsoft SQL Server 2008 R2 Standard and Enterprise software, SQL Server™ 2008 Standard and Enterprise software with SP2, or SQL Server™ 2005 Standard and Enterprise software with SP3 (32 bit)
	Windows Server 2003 R2 OS (32-bit) with SP2 (Includes Microsoft IIS Version 6.0) Supports Microsoft SQL Server 2008 R2 Standard and Enterprise software, SQL Server 2008 Standard and Enterprise software with SP2, or SQL Server 2005 Standard and Enterprise software with SP3 (32 bit)
Network Communication	Ethernet network interface card 10/100 Mbps (100 Mbps network recommended) **Note:** The computer hosting the SCT application supports only one network interface card.
Optional Software Packaging	The ADS, ADX, and Ready Access Portal software include SCT software.

1 Our computer platform and memory recommendations are not meant to imply that older or slower machines are not usable. Refer to the *Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279)* for more information regarding computer/server recommendations.

2 Refer to the *Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-1201279)* for specific Microsoft Windows OS settings that may be required for your Metasys system configuration.

CCT Technical Specifications

Table 14: Controller Configuration Tool (CCT) System Requirements

Recommended Computer/Server Platform	Intel® Core™ 2 Duo E6700 or better (Intel Core 2 Duo E4300 minimum) 20 GB free hard disk available (600 MB minimum) DVD drive
Recommended Memory	Computer Platforms: 2 GB RAM recommended (1 GB RAM minimum) Server Platforms: 4 GB RAM recommended (2 GB RAM minimum)
Supported Operating System (OS) and Database Software	**Windows® 7 OS Professional, Enterprise, and Ultimate Editions (32- or 64-bit) with SP1** (includes Microsoft® IIS Version 7.5) Supports Microsoft SQL Server™ 2005 Express software with SP3 or Microsoft SQL Server 2008 Express R2 with SP1 **Note:** The OS and software must both be 32-bit or 64-bit.
	Windows XP® OS Professional Edition (32-bit) with SP3 (includes Microsoft IIS Version 5.1) Supports Microsoft SQL Server 2005 Express software with SP3 or Microsoft SQL Server 2008 Express R2 software with SP1
Required Web Browser Software for Metasys Client Computers	Windows Internet Explorer® Version 7.0, 8.0, or 9.0 **Note:** The Internet Explorer web browser is required to use the CCT Help.
Network Communication	Ethernet network interface card 10/100 Mbps (100 Mbps network recommended)
Software Optionally Installed During CCT Install	Microsoft .NET Framework Version 3.5 with SP1 or 3.5.1 Microsoft SQL Server 2008 Express R2 software
Additional Requirements (Order Separately)	Bluetooth® Commissioning Converter (MS-BTCVT-1) Laptop with Bluetooth® wireless communications or a computer with a USB Bluetooth converter USB Dongle with ZigBee™ Driver (ZFR-USBHA-0) provides a wireless connection through the CCT to allow wireless commissioning of the wirelessly enabled FEC and VMA16 field controllers. Also allows use of the ZCT in CCT. Adobe® Reader® software **Note:** A PDF reader software is required for the Print function in CCT.
Optional Hardware	Any network or local printer supported by the qualified Windows operating system

NxE85 Technical Specifications

Table 15: MS-NIE8500-0 System Requirements

Computer Type	Dell® PowerEdge® R410 or latest equivalent
Power Requirement	100–240 VAC 50/60 Hz
Power Supply	480 W
Ambient Operating Conditions	10 to 35°C (50 to 95°F); 20 to 80% RH, noncondensing (twmax=29C)
Ambient Storage Conditions	-40 to 65°C (-40 to 149°F); 5 to 95% RH, noncondensing (twmax=38C)
Data Protection	Recommended uninterruptible power supply (UPS): American Power Conversion (APC®) Smart-UPS SC 450 VA, 280 W, 120 VAC input/output, NEMA 5–15R output connections, OEM Part No. SC450RM1U
Processor	Intel® Xeon® E5506, 2+ GHz, 4 MB Cache2 or comparable (subject to availability)

Table 15: MS-NIE8500-0 System Requirements

Memory	2 GB or more, 1066 MHz or higher, 2 x 1 GB, single ranked UDIMMs for 1 processor
Hard Disk	2 total (providing ample storage space, size subject to availability), 7.2K RPM Serial Advanced Technology Attachment (SATA), 8.9 cm (3.5 in.) cabled 3 Gbps, RAID 1 configuration with add-in SAS6/iR (SATA/SAS controller) or higher
Internal Optical Drive	DVD ROM, SATA
Operating System	Windows Server® 2008 R2 OS (64-bit)
Antivirus Software	Symantec® Endpoint Protection, Small Business Edition (latest version)
Network and Serial Interfaces	2 RJ45 1 Gbps Ethernet Ports, Port 2 is disabled 2 video ports (1 front, 1 back) 1 9-pin serial port 4 USB ports (2 front, 2 back)
Dimensions (Height x Width x Depth)	4.3 x 43.4 x 62.7 cm (1.7 x 17.1 x 24.7 in.)
Mounting	Mount in an EIA-310D compatible server cabinet
Shipping Weight	15.9 kg (35 lb)
Compliance	Europe: CE Mark (Record Holder: http://www.dell.com/regulatory_compliance)

Table 16: NxE85 Software System Requirements

Product Code	**MS-NxE85SW-0:** NxE85 software for 10,000 objects (new projects only software)
Recommended Computer Platform	Intel Xeon E5506, 2.13 GHz, 4 MB Cache 2 x 160 GB 7.2K RPM Serial Advanced Technology Attachment (SATA), 8.9 cm (3.5 in.) Cabled 3 Gbps, RAID 1 configuration with add-in SAS6/iR (SATA/SAS Controller) DVD ROM, SATA
Recommended Memory	1 GB RAM minimum
Hard Disk	160 GB minimum
Supported Operating Systems and Software	**Windows Server® 2008 R2 OS (64-bit) with SP1** IIS Version 7.5, Microsoft .NET Framework Version 3.5.1 and 4.0 **Windows Server 2008 OS (32-bit) with SP2** IIS Version 7.0, Microsoft .NET Framework Version 3.5.1 and 4.0 **Windows Web Server 2008 OS (32-bit) with SP2** IIS Version 7.0, Microsoft .NET Framework Version 3.5.1 and 4.0
Network Communication	Network Interface Single 1 Gbps Ethernet network interface card 10/100/1000 Mbps (100 Mbps or better recommended)
Recommended Data Protection	Uninterruptible Power Supply (UPS): American Power Conversion (APC) Smart-UPS SC 450VA, 280 W, 120 VAC input/output, NEMA 5-15R output connections, OEM Part No. SC450RM1U

Metasys System Related Documentation

The documents in *Table 17* contain information related to the features, installation, operation, configuration, and troubleshooting of the Metasys system. Important user information is located in the Metasys system *Help (LIT-1201793)*.

Table 17: Related Documentation

For Information On	See Document	LIT or Part Number
Features, Benefits, and Specifications of the Application and Data Server (ADS)/Extended Application and Data Server (ADX)	*Application and Data Server (ADS/ADX) Product Bulletin*	*LIT-1201525*
Features, Functions, and Applications of the Network Automation Engine (NAE) 35, NAE45, NAE55, and NAE85 in the Metasys System, Including Technical Specifications and Ordering Information	*Network Automation Engine (NAE) Product Bulletin*	*LIT-1201160*
Features, Functions, and Applications of the Network Integration Engine (NIE) 55 and NIE85 in the Metasys System, Including Technical Specifications and Ordering Information	*Network Integration Engine (NIE) Product Bulletin*	*LIT-1201537*
Features, Functions, and Applications of the Network Control Engine (NCE) 25 in the Metasys System, Including Technical Specifications and Ordering Information	*Network Control Engine (NCE) Product Bulletin*	*LIT-12011283*
Features, Benefits, and Specifications of the System Configuration Tool (SCT)	*System Configuration Tool Product Bulletin*	*LIT-1201536*
How to Install and Upgrade the ADS, ADX, and SCT Software; How to Maintain SCT Databases from Multiple Releases; How to Install the Metasys Advanced Reporting System	*ADS, ADX, and SCT Installation and Upgrade Instructions Wizard*	*LIT-12011521*
How to Install the ADS-Lite	*ADS-Lite Installation and Upgrade Instructions Wizard*	*LIT-12011688*
How to Use the Metasys Database Manager to Manage Historical Data on an ADS	Metasys Database Manager *Help*	*LIT-12011202*
How to License Metasys System Software (ADS/ADX, NxE85, and Others)	*Software License Activator Technical Bulletin*	*LIT-1201654*
How to Install the CCT Software	*CCT Installation Instructions*	*LIT-12011529*
How to Install the Graphic Generation Tool	*Graphic Generation Tool Installation Instructions*	*LIT-12011685*
How to Use the Advanced Reporting System	Metasys Advanced Reporting System *Help*	*LIT-12011312*
How to Use Ready Access Portal UI	Ready Access Portal *Help*	*LIT-12011342*
How to Use Graphic Generation Tool	Graphic Generation Tool *Help*	*LIT-12011697*
How to Configure an ADS/ADX to be Site Director, Use ADS Repositories, Synchronize Time, Use a Network Printer, Accept Dial-Up Connections, and More	*ADS/ADX Commissioning Guide*	*LIT-1201645*
How to Apply, Mount, Wire, Set Up, and Start the NAE35 and the NAE45, Including Technical Specifications and Ordering Information	*NAE35/NAE45 Installation Instructions*	*Part No. 24-10050-6*

Table 17: Related Documentation

For Information On	See Document	LIT or Part Number
How to Apply, Mount, Wire, Set Up, and Start the NAE55 and NIE55, Including Technical Specifications and Ordering Information	*NAE55/NIE55 Installation Instructions*	*Part No. 24-10051-0*
How to Apply, Mount, Wire, Set Up, and Start the NCE25, Including Technical Specifications and Ordering Information	*NCE25 Installation Instructions*	*Part No. 24-10143-63*
How to Set Up an NAE35, NAE45, and NAE55 for Network Connectivity and Access the NAE User Interface to Set the Basic Parameters	*NAE Commissioning Guide*	*LIT-1201519*
How to Set Up an NAE85/NIE85 for Network Connectivity and Access the NAE85 User Interface to Set the Basic NAE85 Parameters	*NxE85 Commissioning Guide*	*LIT-12011044*
How to Set Up a LonWorks® Control Server (LCS) 85 for Operation on the Metasys® Network	*LCS85 Commissioning Guide*	*LIT-12011568*
How to Use the SCT, Including Setting Up Archive Databases Offline and Basic N2 Online Network Setup	*SCT Technical Bulletin*	*LIT-1201534*
N1 Migration with an NIE	*N1 Migration with the NIE Technical Bulletin*	*LIT-1201535*
How to Integrate an N2 Network into the Metasys System	*N2 Integration with the NAE Technical Bulletin*	*LIT-1201683*
How to Install the NAE/NIE Update Tool and Update NxEs From One Release to Another	*NAE/NIE Update Tool Technical Bulletin*	*LIT-12011524*
Network Information (Including Security Risks)	*Network and IT Guidance for the BAS Professional Technical Bulletin*	*LIT-12011279*
	Network and IT Considerations for the IT Professional Technical Bulletin	*LIT-1201578*
How to Apply and Engineer a Metasys Smoke Control System that Complies with the Metasys System UL 864 9th Edition UUKL/ORD-C100-13 UUKLC Smoke Control Listing	*Metasys® System UL 864 9th Edition UUKL/ORD-C100-13 UUKLC Smoke Control System Technical Bulletin*	*LIT-12011252*
Devices and Logic Used to Implement a Ninth Edition Smoke Control System for Single Story Mall, Warehouse, and Multistory Building	*Metasys® System UL 864 9th Edition UUKL/ORD-C100-13 UUKLC Standard Smoke Control Applications Application Note*	*LIT-12011308*
How to Integrate a Fire System into the Metasys Network	*Metasys System Extended Architecture Fire System Integration Using the IFC BACnet® Gateway Application Note*	*LIT-1201993*
NAE Compliance with American National Standards Institute (ANSI)/American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Standard 135-2004, BACnet® Protocol	*NAE/NCE Protocol Implementation Conformance Statement Technical Bulletin*	*LIT-1201532*
NIE Compliance with ANSI/ASHRAE Standard 135-2004, BACnet Protocol	*NIE Series Protocol Implementation Conformance Statement Technical Bulletin*	*LIT-1201672*
How to Install the Launcher software	*Launcher Installation Instructions*	*LIT- 12011783*

Table 17: Related Documentation

For Information On	See Document	LIT or Part Number
How to use the Launcher software to shorten the UI Access Time to shorten the UI Access Time and manage sites	*Launcher Help*	*LIT-12011742*
How to Use Web Service Technology for Secure Access to the Metasys System	*Metasys System Secure Data Access DLL Technical Bulletin*	*LIT-1201663*
How to Create and Modify Users and Roles, Configure User Profiles, Assign System Access Permissions, Assign All Items Navigation View Permissions, and Unlock User Accounts	*Security Administrator System Technical Bulletin*	*LIT-1201528*
How to Set Up an MS/TP Communications Bus	*MS/TP Communications Bus Technical Bulletin*	*LIT-12011034*
How to Set Up an NAE as a BACnet/IP or BACnet MS/TP System Integrator in a Metasys Network	*BACnet Controller Integration with NAE/NCE Technical Bulletin*	*LIT-1201531*
How to Set Up an NAE or LCS85 as a LonWorks Network Integrator	*LonWorks Network Integration with NAE and LCS Technical Bulletin*	*LIT-1201668*
Direct Serial Connections and Dial-up Modem Connections between NAE/NIEs and a Computer Running Microsoft® Windows 7 Operating System (OS) or Windows XP® OS	*Metasys System Extended Architecture Direct Connection and Dial-Up Connection Application Note*	*LIT-1201639*
How to Change a Non-Tunneling NAE55/NIE55 into an NAE55 with N2 Tunneling Capabilities, and Vice Versa	*ToggleTunnel and ChangeModel Technical Bulletin*	*LIT-12011531*
How to Convert an NAE55 to an NIE55, and Vice Versa, Using ChangeModel	*ToggleTunnel and ChangeModel Technical Bulletin*	*LIT-12011531*
How to Configure and Enable the Demand Limiting and Load Rolling (DLLR) Features on the System	*DLLR Technical Bulletin*	*LIT-12011288*
How to Use CCT Software	Controller Tool *Help*	*LIT-12011147*
Features, Benefits, and Specifications of the Ready Access Portal Software	*Ready Access Portal Software Catalog Page*	*LIT-1900538*
How to Use the Ready Access Portal UI	Ready Access Portal *Help*	*LIT-12011342*
ZFR1800 Series Wireless Field Bus System	*ZFR1800 Series Wireless Field Bus System Technical Bulletin*	*LIT-12011295*
TEC Wireless Thermostat Controller System	*TEC Series Wireless Thermostat Controller System Technical Bulletin*	*LIT-12011414*
WRS Series Many-to-One Wireless Room Temperature Sensing System	*WRS Series Many-to-One Wireless Room Temperature Sensing System Technical Bulletin*	*LIT-12011095*
TE-7800 Series One-to-One Wireless Room Temperature Sensing System	*TE-7800 Series One-to-One Wireless Room Temperature Sensing System Technical Bulletin*	*LIT-12011097*
WRZ-7850 One-to-One Wireless Room Temperature Sensing System	*WRZ Series One-to-One Wireless Room Sensing System Technical Bulletin*	*LIT-12011641*

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